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First record of the genus *Buthus* Leach, 1815 from Kenya (Scorpiones: Buthidae) and description of a new species

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Abstract

A new species of scorpion, *Buthus turkana* sp. n. (Scorpiones: Buthidae), is described from the northwest of Kenya, in the Turkana County nearby Lake Turkana, in the Kenyan Rift Valley. This is the first record of a *Buthus* species in Kenya, enlarging the pattern of distribution of the genus.

Keywords: Keywords: Scorpion, *Buthus*, new species, first record, Kenya.

Introduction

Since the description of *Buthus occitanus berberensis* and *B. ocitanus zeylensis* by Pocock (1900) from Somaliland (Somalia), several studies have dealt with the scorpions of the Horn of Africa, leading to the description of more new species (Lourenço, 2003, 2005; Kovařík, 2011; Rossi & Tropea, 2016a, 2016b; Kovařík *et al.*, 2020). A precise knowledge of the scorpion fauna of this region is however still far from being achieved and a new species of *Buthus* is now described from the northwest of Kenya, in the Turkana County nearby Lake Turkana, in the Kenyan Rift Valley. This is the first record of the genus *Buthus* in this country, enlarging the pattern of distribution of the genus.

Methods

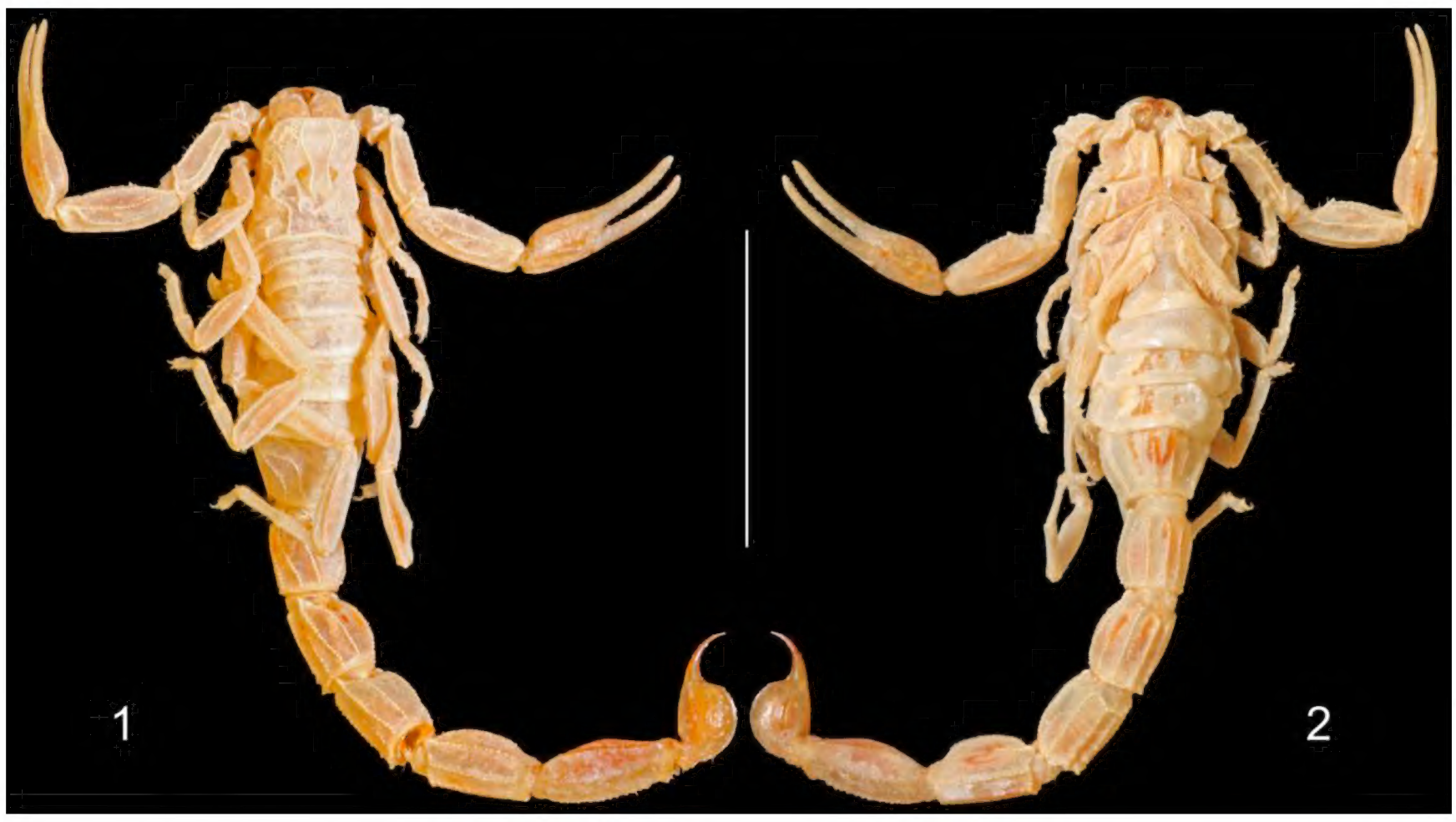
Illustrations and measurements were made with the aid of a Wild M5 stereo-microscope with a drawing tube (camera lucida) and an ocular micrometer. Map was made using Google Maps and Adobe Photoshop software. Measurements follow Stahnke (1970) and are given in mm. Trichobothrial notations follow Vachon (1974) and morphological terminology mostly follows Vachon (1952) and Hjelle (1990).

Taxonomy

Family **Buthidae** C.L. Koch, 1837
Genus ***Buthus*** Leach, 1815
Buthus turkana sp. n. (Figs. 1-10)

Kenya, Turkana County, N Lokitaung (near to the borders with Ethiopia and South Sudan), 420 m alt., desert shrub and grass, under large rock (not a psamophile species), XI/1970 (D. Rodhain). 1 pre-adult ♂ holotype deposited in Muséum national d'Histoire naturelle, Paris.

Etymology. The specific name is placed in apposition to the generic name and refers to the nearby Lake Turkana.



Figs. 1-2. *Buthus turkana* sp. n., ♂ holotype, habitus. 1. dorsal aspect. 2. ventral aspect. (Scale bar: 1 cm).

Diagnosis. Scorpion probably of small to moderate size in relation to other species of the genus; the pre-adult male reaches a total length of 32.5 mm. General colouration yellow to pale yellow without spots; only some carinae are slightly reddish. Carinae moderately marked; ventral carinae of metasomal segments II-III moderately lobate; two lateral lobes on metasomal segment V; granulations moderately to weakly marked. Telson globular and granulated with a very short aculeus. Fixed and movable fingers with 9-10 (10-10) rows of granules. Pectines with 34-33 teeth in male. Trichobothrial pattern A-**β** (beta), orthobothriotaxic; on femur, trichobotrium $\mathbf{d_2}$ extremely reduced and trichobothrium $\mathbf{d_5}$

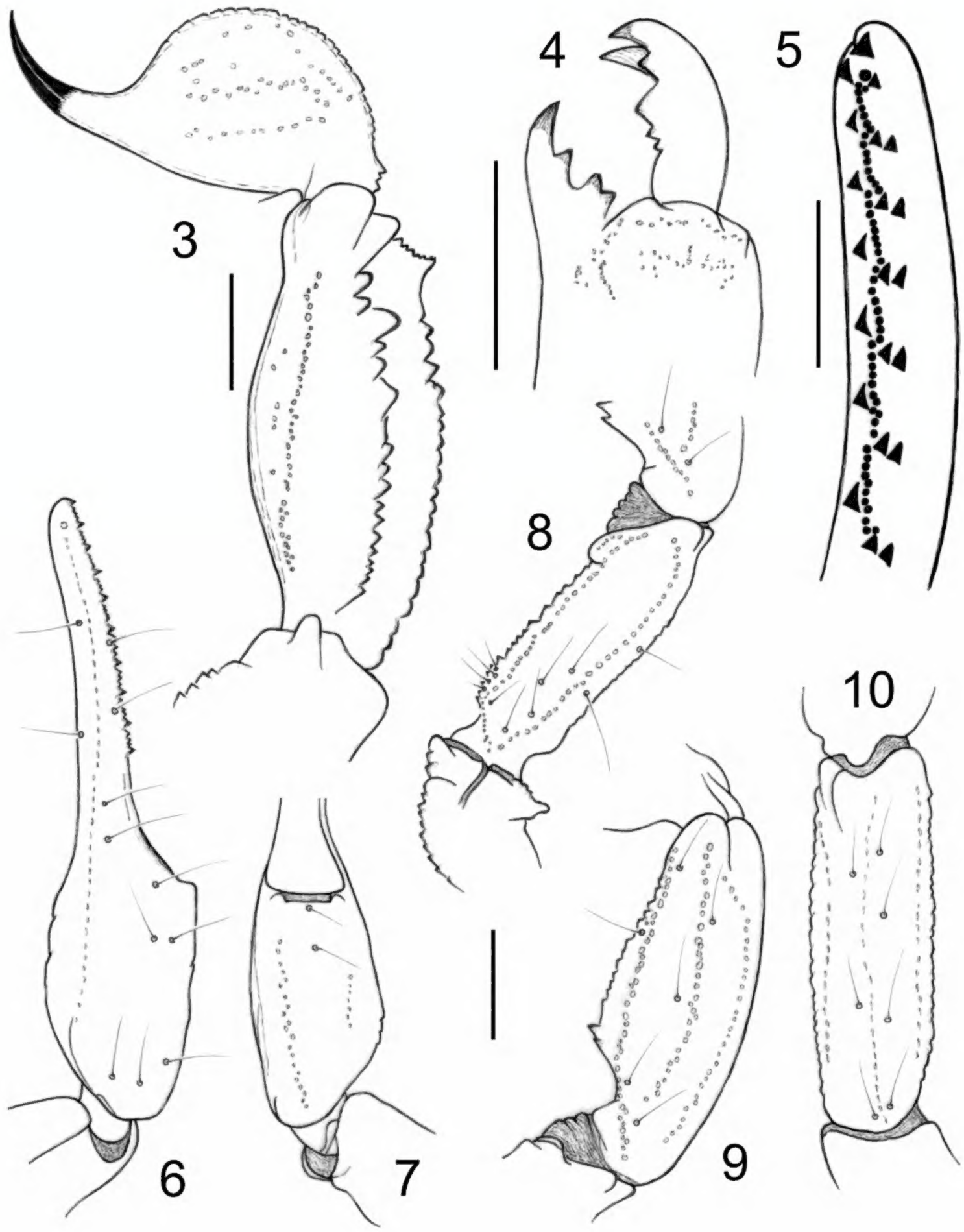
distal in relation to $\mathbf{e_1}$; on patella, external trichobothrium $\mathbf{esb_1}$ distal in relation to $\mathbf{esb_2}$. Tibial spurs strongly developed.

Description (based on male holotype; measurements after the description).
Colouration basically yellow to pale yellow without spots; only some carinae are slightly reddish. Prosoma: carapace yellow; eyes only slightly marked by dark pigment. Mesosoma yellow without spots; the median carina slightly reddish. Metasomal segments yellow with some reddish spots over carinae; vesicle pale yellow; aculeus yellow at its base and slightly reddish at its extremity. Venter yellow; pectines and genital operculum pale yellow. Chelicerae pale yellow without any variegated spots; fingers yellow with reddish teeth. Pedipalps yellow with carinae and oblique rows of granules in fingers slightly reddish. Legs pale yellow.

Morphology. Carapace weakly granular; anterior margin almost straight. Carinae moderately to strongly marked; anterior median strongly granular, central median and posterior median carinae moderately granular, with 'lyre' configuration. All furrows moderate. Median ocular tubercle almost in the middle of the carapace. Eyes separated by almost two ocular diameters. Four pairs of lateral eyes; the first three of moderate size in relation to median eyes; the fourth pair reduced in size. Sternum triangular, not narrowed; slightly wider than long. Mesosoma: tergites weakly granular. Three longitudinal carinae moderately to weakly crenulate in all tergites; lateral carinae strongly reduced in tergites I and II; tergite VII pentacarinate. Venter: genital operculum divided longitudinally, each plate with a semi-oval to semi-triangular shape. Pectines: pectinal tooth count 34-33 in male holotype; middle basal lamella of the pectines not dilated. Sternites without granules, smooth with elongated spiracles; four carinae on sternite VII; other sternites acarinated and with two vestigial furrows. Metasomal segments with a weak setation; segments I to III with ten crenulated carinae; ventral better marked on II-III, with marked lobate granules; segment IV with eight carinae, crenulated; all segments with a smooth dorsal depression; segment V with five carinae; the latero-ventral carinae crenulate with 4-5 lobate denticles posteriorly; ventral median carina divided posteriorly over 1/4 of the segment length; anal arc composed of 9-10 ventral teeth, and two strong lateral lobes. Intercarinal spaces weakly granular. Telson with several granulations ventrally, less marked laterally; aculeus curved and shorter than the vesicle, without a subaculear tubercle. Cheliceral dentition as defined by Vachon (1963) for the family Buthidae; external distal and internal distal teeth of approximately the same length; basal teeth on movable finger small but not fused; ventral aspect of both fingers and manus covered with long dense setae. Pedipalps without setations; femur pentacarinate; patella with eight carinae, strongly marked; all faces weakly granular to smooth; chela almost smooth, with some weak dorsal carinae. Fixed and movable fingers with 9-10 (10-10) oblique rows of granules. Internal and external accessory granules present, moderately strong; three accessory granules on the distal end of the movable finger next to the terminal denticle. Legs: tarsus with two longitudinal rows of setae ventrally; tibial spurs very strong on legs III and IV; pedal spurs strong on legs I to IV. Trichobothriotaxy: trichobothrial pattern of Type A, orthobothriotaxic as defined by Vachon (1974). Dorsal trichobothria of femur arranged in β (beta) configuration (Vachon. 1975).

Morphometric values of the pre-adult male holotype of *Buthus turkana* sp. n. Total length including the telson 32.5. Carapace: length 3.8, anterior width 2.4, posterior width 4.0. Mesosoma length 8.6. Metasomal segments: I length, 2.4, width 2.4; II length 2.8, width 2.2; III length 3.0, width 2.2; IV length 3.5, width 2.1; V length 4.6, width 2.0, depth 1.8. Telson length 3.8, vesicle: width 1.9, depth 1.8. Pedipalp: femur length 3.3, width 1.0;

patella length 3.8, width 1.4; chela length 6.2, width 1.3, depth 1.2; movable finger length 4.2.



Figs. 3-10. *Buthus turkana* sp. n., ♂ holotype. 3. metasomal segment V and telson, lateral aspect. 4. chelicera, dorsal aspect. 5. distal end of movable finger with longitudinal series of granules and accessory granules. 6-10. trichobothrial pattern. 6-7. chela. 6. dorso-external aspect. 7. ventral aspect. 8. femur, dorsal aspect. 9-10. patella. 9. dorsal aspect. 10. external aspect. (Scale bars: 1 mm except chelicera 0.5 mm).

Relationships. *Buthus turkana* sp. n. certainly belongs to the '*Buthus occitanus*' complex of species. The new species is, however, quite singular by its very pale pattern of pigmentation and probably small size. It can be distinguished from other species of *Buthus* and in particular from the two morphologically closest species *Buthus jianxinae* Lourenço, 2005 (Southern South Sudan) and *Buthus berberensis* Pocock, 1900 (Northern

Somaliland) notably by the following characters: (i) very pale uniform colour pattern, without any spot, (ii) only 9-10 (10-10) rows of granules in pedipalp fingers, (iii) a globular telson with a very short and weakly curved aculeus, (iv) tibial spurs strongly developed and (v) femur, trichobothrium $\mathbf{d_2}$ extremely reduced; trichobothrium $\mathbf{d_5}$ distal in relation to $\mathbf{e_1}$. On patella, external trichobothrium $\mathbf{esb_1}$ distal in relation to $\mathbf{esb_2}$. Another feature is the disjunct geographical distribution presented by the new species as well as different biotope compared with both mentioned species.

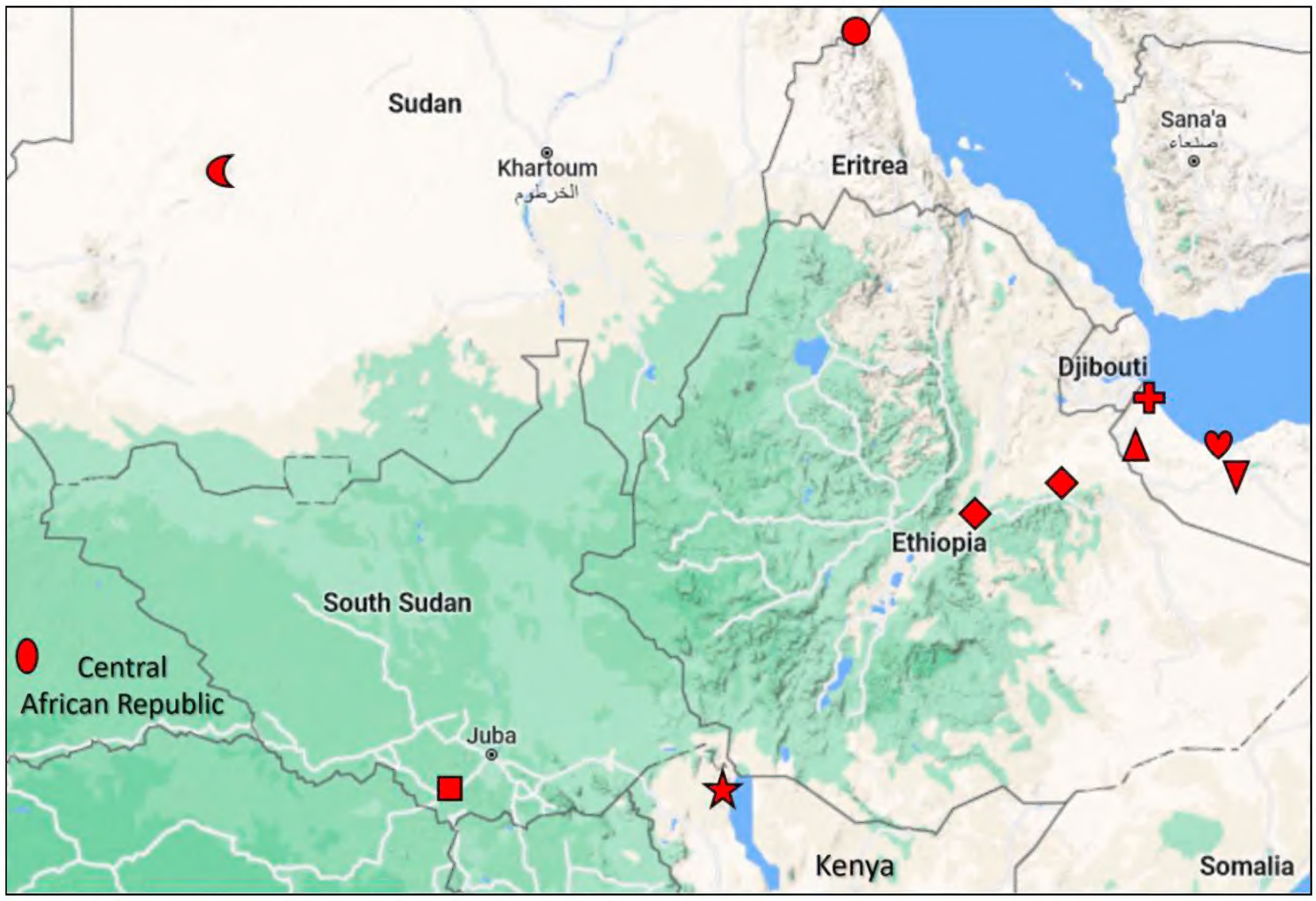


Fig. 11. Relief and vegetation map of the Horn of Africa showing the type localities of *Buthus* species distributed in the region: *B. berberensis* Pocock, 1900 (heart), *B. zeylensis* Pocock, 1900 (cross), *B. brignolii* Lourenço, 2003 (crescent), *B. jianxinae* Lourenço, 2005 (square), *B. awashensis* Kovařík, 2011 (rhombus), *B. centroafricanus* Lourenço, 2016 (oval), *B. karoraensis* Rossi & Tropea, 2016 (circle), *B. pococki* Kovařík, Šťáhlavský & Elmi, 2020 (triangle), *B. somalilandus* Kovařík, Šťáhlavský & Elmi, 2020 (inverted triangle) and *B. turkana* sp. n. (star).

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Buthus turkana **Ythier & Lourenço, 2022**
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Serket (2022) vol. 19(1): 7-14.

Complementary information on *Compsobuthus khaybari* Abu Afifeh, Aloufi & Al-Saraireh, 2021, with the description of an adult female (Scorpiones: Buthidae)

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Abstract

Compsobuthus khaybari was described by Abu Afifeh *et al.* (2021) based on a single male collected form Ain El-Hamah, Khaybar, Saudi Arabia. Recently more specimens were collected from Mughera'a including males and one female. The female of this species is fully described and illustrated.

Keywords: Scorpions, *Compsobuthus khaybari*, Khaybar, Arabian Peninsula.

Introduction

Despite the wide distribution of species of the genus *Compsobuthus* Vachon, 1949 throughout Africa and Asia with 49 described species (Kovařík, 2003), the taxonomy of this particular genus is poorly understood and is the subject of extensive debate among scorpion systematists. Many attempts to define the sub-genus groups resulted in generally accepted morphological characters to divide the genus into the *"werneri"* and "*acutecarinatus"* groups based on the presence or absence of outer accessory granules on

the pedipalp chela fingers, even this character proved to be unstable and have some exceptions (Kovařík, 2003).

As already presented in several previous publications (Hendrixson, 2006; Abu Afifeh *et al*., 2021; Alqahtani & Badry, 2021), several species of the genus *Compsobuthus* are widely distributed in Saudi Arabia, inhabiting diverse habitats across the country. *Compsobuthus khaybari* was recently described by Abu Afifeh *et al*. (2021) based on a single male collected form Ain El-Hamah, Khaybar.

The present note describes the female of *Compsobuthus khaybari* based on new material collected from Saudi Arabia, with comparison of male and female.

Methodology

Illustrations and measurements were made with the aid of stereoscopic microscope with a camera and an ocular micrometer (efix). Measurements follow Stahnke (1970) and are given in mm, with the following exceptions: carinal terminology is after Francke (1977), trichobothrial notations follow Vachon (1974, 1975) and morphological terminology mostly follows Vachon (1952) and Hjelle (1990).

Taxonomic treatment

Family Buthidae C.L. Koch, 1837

Compsobuthus Vachon, 1949

Compsobuthus khaybari Abu Afifeh, Aloufi & Al-Saraireh, 2021 (Figs. 1-5)

Abu Afifeh *et al.* (2021): 365-372, figs. 1-2, 3A, table I.

Type specimens: Holotype male from Ain El-Hama (25°44'50.99"N 39°15'36.48"E), Khaybar, Saudi Arabia; deposited in the Department of Biology, The University of Jordan, Amman, Jordan.

New material studied: 1♀, 4♂♂, Mughera'a (Old Farms) (Al Ula Governorate, Al Madinah Al Monawwarah Province), 26°27'19.70"N 38°02'21.50"E, 15.5.2022, *leg*. A. Aloufi. Specimens were deposited in the collections of the University of Jordan, Amman, Jordan.

Diagnosis: Small scorpions, generally less than 35 mm in length; body colour generally yellowish to reddish-yellow or reddish-brown; ventral surface of sternites and metasoma with a numerous setae; Pectinal tooth count 20-22 in males and 17-17 in the female; pedipalp chela fingers with outer accessory granules (*werneri* group); pedipalp chela fingers with 9-10 rows of granules along dentate margin; male with a recess and lobe at the base of chela fingers and less pronounced in the female; lateral inframedian carinae on metasomal segments II and III present.

Description of *Compsobuthus khaybari* female

Colouration: Generally yellowish to reddish-yellow or reddish-brown with spots over carapace and tergites carinae and metasomal segment V; eyes surrounded by black pigment, vesicle yellowish; aculeus yellowish at the base and dark reddish at the tip (Fig. 1).

Morphology

Prosoma: Anterior margin of the carapace is slightly concave and bears nine short macrosetae, median eyes located on anterior one-half of carapace and separated by one

ocular diameter, eyes surrounded by black pigmentation, centromedian and posteriomedian carinae fused; posteriomedian carinae projecting beyond posterior margin as distinct spiniform processes. The carinae are moderately to strongly developed and granular. Intercarinal spaces shagreened with higher concentration of coarse granules laterally also between anteriomedian carinae and lateral eyes. Three pairs of lateral eyes of moderate size. Carapacial margins granular.

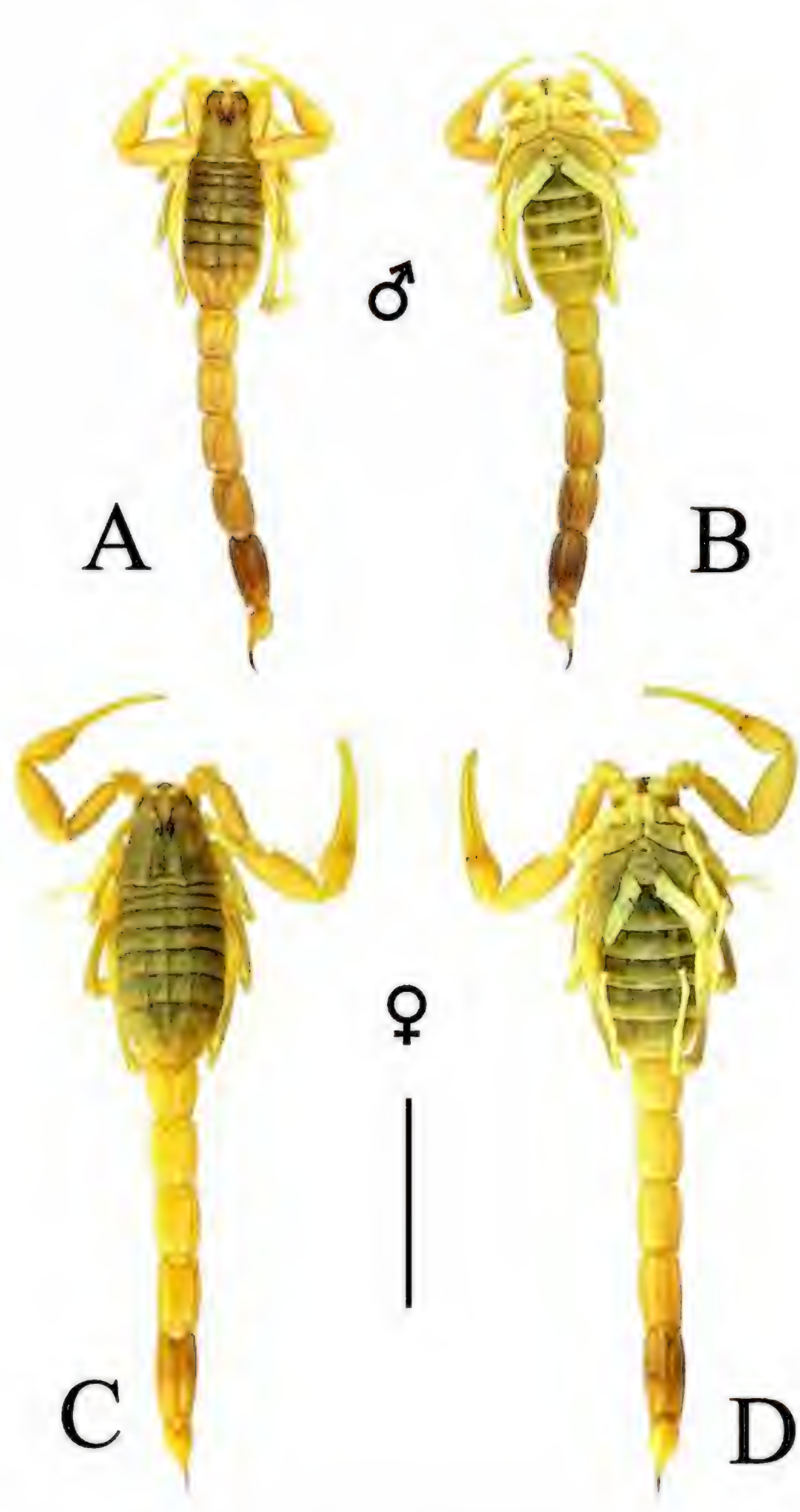

Fig. 1. *Compsobuthus khaybari*. A-B. Male. C-D. Female. A, C. dorsal aspect. B, D. ventral aspect. (Scale bar: 1 mm).

Mesosoma: Tergites I-VI tricarinate; carinae moderate, granular to finely serrate, each carina terminates in a spiniform process that extends well past the posterior margin of the tergite; space between carinae shagreened; lateral spaces with discontinuous coarse

granules. Tergite VII pentacarinate; median carinae present on anterior one-half, granular to finely serrate. Sternites III-V smooth; devoid of carinae; sternite VI with two pairs of carinae, intercarinal spaces moderately shagreened, submedian carinae obsolete, smooth, and lateral carinae weak, finely serrate. Sternite VII with two pairs of carinae, submedian carinae moderate, and lateral carinae strong present on anterior two-thirds, granular to finely serrate; Sternites III-VII with numerous setae; more densely on III-V. Pectinal tooth count: 17-17. Pectines with 3 marginal lamellae and 7 middle lamellae. The lamellae bear numerous dark setae, and each fulcrum bears 2-3 dark setae. Pectines not reaching coxa-trochanter articulation of leg IV in the female.

Metasoma: All segments longer than wide becoming narrower posteriorly; all segments are setose, mainly on ventral surface, and granulated. Segment V 2.28 times longer than wide. Metasomal segment I with 10 carinae, II-IV with 8 carinae, and V with 5 carinae. Segments I-IV: dorsolateral and lateral supramedian carinae strong, serrate, terminating in a slightly enlarged distal spinoid denticles. Lateral inframedian carinae on segment I strong, serrate; on II present on posterior four-fifths, weak to moderate, serrate; on III represented by only a few granules distally; on IV absent. Ventrolateral carinae on all segments moderate to strong, serrate. Ventral submedian carinae on segments I-IV moderate to strong. All surfaces are shagreened. Ventral surface of segments with numerous setae of varying length; most dense on segments I-III. Segment V: dorsolateral carinae weak to moderate, serrate to granular. Lateromedian carinae absent. Ventrolateral carinae strong, serratocrenulate. Ventromedian carina strong, serrate. Ventral surface between ventrolateral and ventromedian carinae microgranular with sparse few coarse granules. Dorsal surface with a few small granules.

Telson: Subaculear tubercle distinct slightly spinoid and flanked by two long setae. Aculeus shorter than vesicle. Ventral surface with median and paired lateral rows of feebly rounded granules.

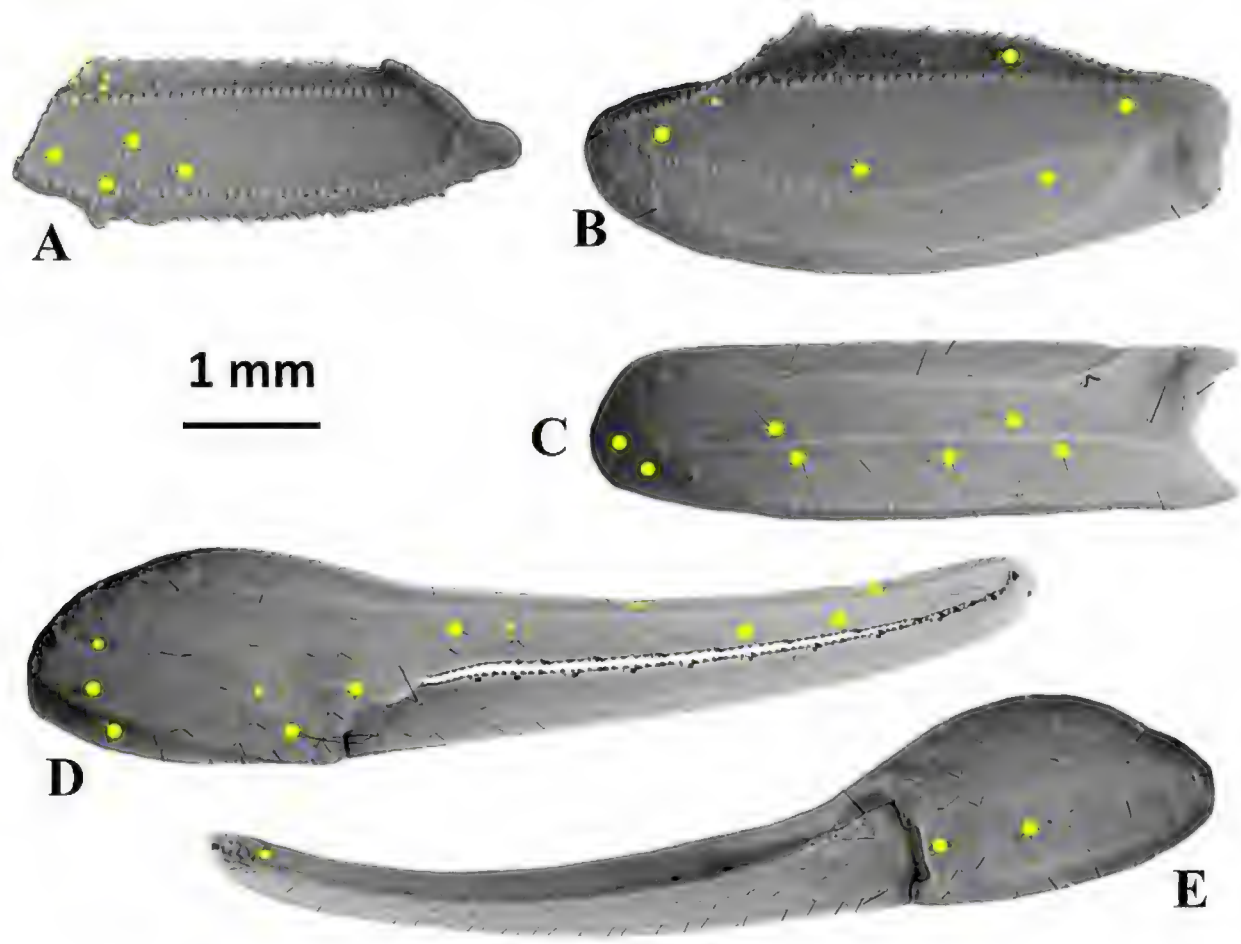

Fig. 2. *Compsobuthus khaybari* Female, trichobothrial arrangement of right pedipalp. A. Femur, dorsal aspect. B-C. Patella. B. dorsal aspect. C. external aspect. D-E. Chela. D. external aspect. E. ventral aspect. (Scale bar: 1 mm).

Pedipalps: Trichobothriotaxy: trichobothrial pattern of Type A, orthobothriotaxic as defined by Vachon (1974); dorsal trichobothria of femur arranged in Beta-configuration (Vachon, 1975). Femur (Fig. 2A): femur with five carinae, all carinae strong, granulose to crenulate. Patella (Figs. 2B & 2C): Patella with eight carinae with dorsointernal and dorsomedian carinae strong, granular; dorsoexternal and ventroexternal carinae moderate, granular; externomedian carinae weak and bears irregular and indistinct granules; ventromedian carinae moderate, serratocrenulate; ventrointernal carinae moderate, granular; inner carinae strong, serrate. Chela (Figs. 2D & 2E): Hand slightly swollen. Dorsal marginal and dorsal secondary carinae with softly granulation; ventroexternal carinae weak, smooth; other carinae obsolete. Fixed and movable fingers with 9 oblique rows of granules; internal and external accessory granules present, strong; four accessory granules on the distal end of the movable finger next to the terminal denticle (Fig. 3B).
Legs: Legs III and IV bear small to moderate tibial spurs; prolateral and retrolateral pedal spurs present on all legs; prolateral pedal spurs basally bifurcate; ventral surface of tarsus with two rows of setae.

Table 1. Measurements for male and female of *Compsobuthus khaybari* from Mughera'a. Measurements and morphometric values (mm).

	♀	♂
Total length / Carapace Length	**34.45** / 4.40	**28.95** / 3.50
Carapace: Anterior width / posterior width	2.60 / 4.60	2.00 / 3.40
Mesosoma / Metasoma length	8.20 / 21.85	7.05 / 18.40
Segment I: Length / Width	2.80 / 2.50	2.30 / 2.05
Segment II: Length / Width	3.20 / 2.20	2.70 / 1.90
Segment III: Length / Width	3.40 / 2.15	2.90 / 1.80
Segment IV: Length / Width	3.90 / 2.10	3.10 / 1.70
Segment V: Length / Width / Depth	4.55 / 2.00 / 2.00	3.60 / 1.65 / 1.60
Telson length / Aculeus length	4.00 / 1.85	3.80 / 1.50
Vesicle: Length / width / Depth	2.15 / 1.50 / 1.50	2.30 / 1.15 / 1.10
Pedipalp Femur: length / width	3.80 / 1.15	3.00 / 0.85
Pedipalp Patella: length / width	4.70 / 1.70	3.70 / 1.35
Pedipalp Chela : length / width / Depth	7.35 / 1.50 / 1.60	5.90 / 1.30 / 1.50
Chela length / Width ratio	4.90	4.54
Movable finger length	5.10	4.05

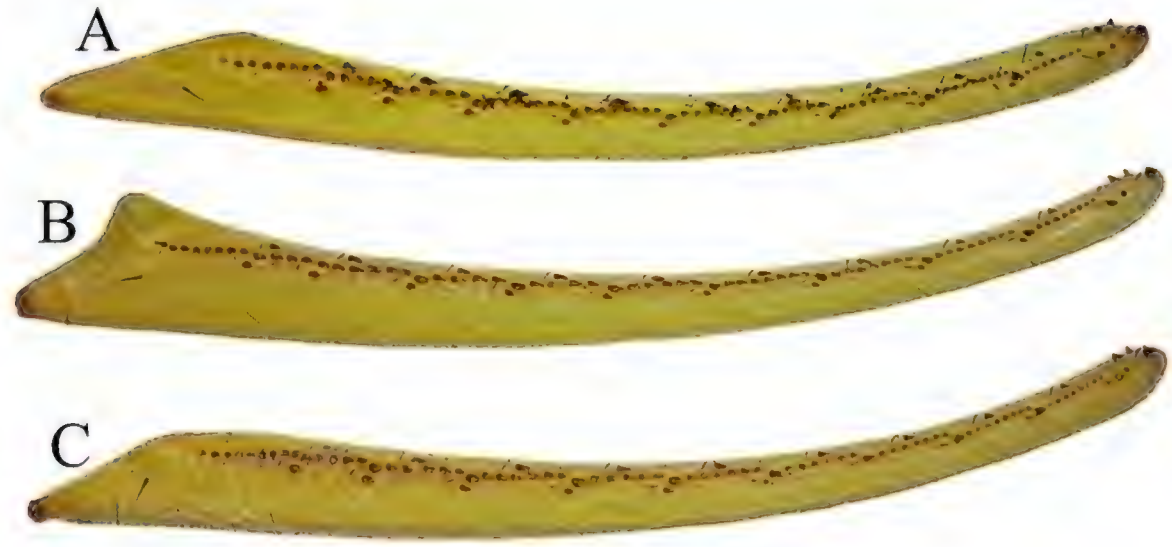

Fig. 3. *Compsobuthus khaybari*, right pedipalp chela movable finger. A. male with a complete set of outer accessory granules. B. female with a complete set of outer accessory granules. C. male with outer accessory granules only on the six proximal rows of denticles.

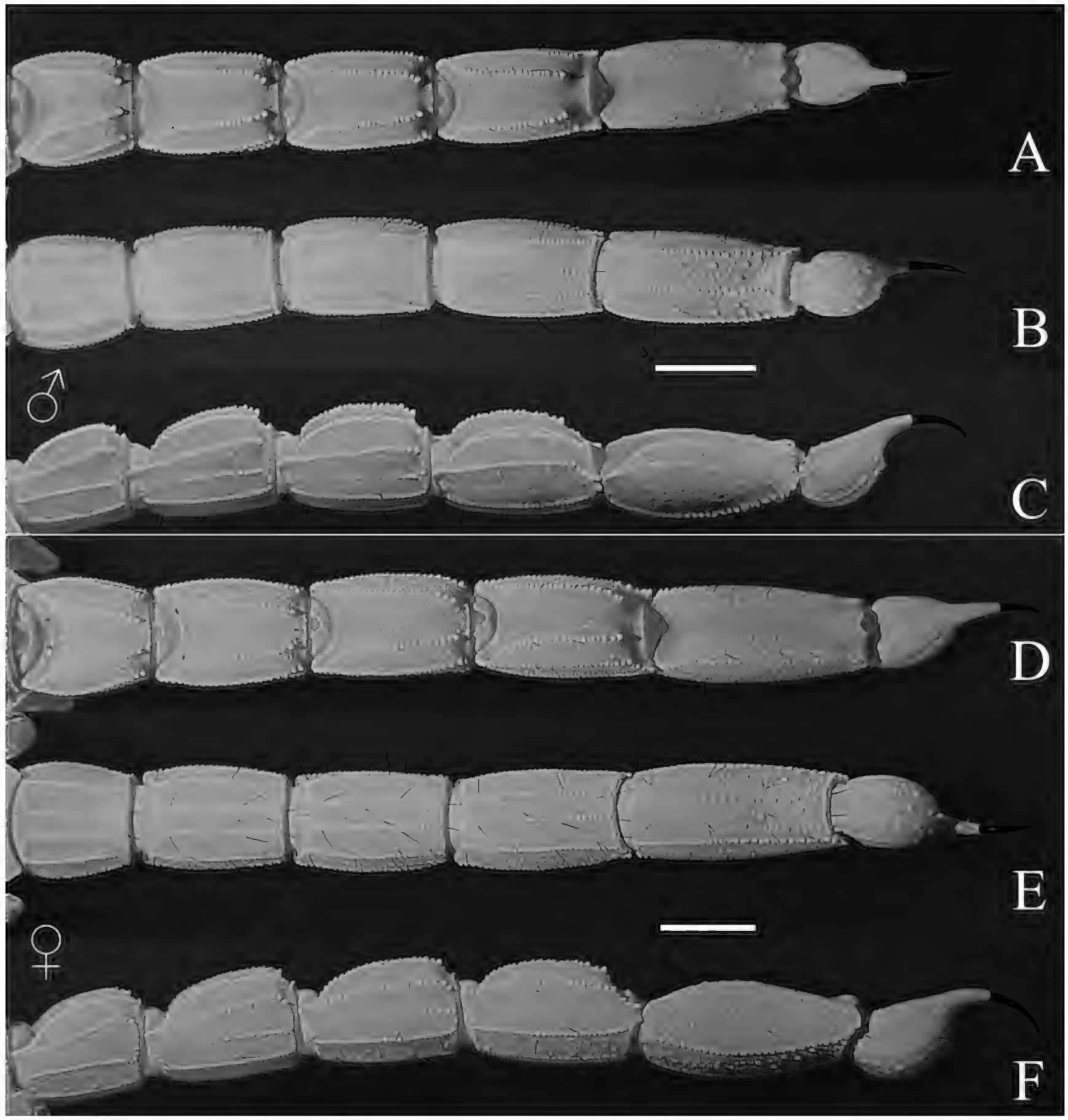

Fig. 4. *Compsobuthus khaybari*, Metasoma. A-C. Male. A. dorsal aspect. B. ventral aspect. C. lateral aspect. D-F. Female. D. dorsal aspect. E. ventral aspect. F. lateral aspect. (Scale bar: 2 mm).

Habitat

Mughera'a village is located in the south-western part of Al-Ula Governorate, 320 km north of Al Madinah Al Monawwarah city, about 580 m above sea level. The collecting site is primarily a heavily irrigated farms with clay soil, densely cultivated by palm and citrus trees (Fig. 5). In addition, scattered vegetations of *Tamarix aphylla, Haloxylon salicornicum*, and *Suaeda vermiculata* are common. Two other scorpion species: *Androctonus crassicauda* (Olivier, 1807) and *Orthochirus* sp. were collected from this site.

Fig. 5. Habitat of the old farms from Mughera'a.

Discussion

Levy & Amitai (1980) divided the genus *Compsobuthus* into two groups mainly on the basis of the presence ("*werneri* group") or absence ("*acutecarinatus* group") of a complement of external accessory denticles on the movable finger of pedipalp chela. Kovařík (2003) also divided species into the '*acutecarinatus*' and '*werneri*' groups depending on a character which is accepted by all authors, i.e. the presence (often very small denticles, which are usually present at all rows and always at more than one-half of rows) vs. absence (occasionally, there may be an external denticle present at the last two or three rows, but at most of the rows it is absent) of external denticles at rows of denticles on the movable finger of pedipalp chela, moreover Kovařík (2003) divided the '*acutecarinatus*' group into two subgroups on basis of the presence or absence of internal denticles at the rows of denticles on the movable finger of pedipalp chela, he also drew the attention to the fact that this character is not perfect and allows for a third group of species in which external accessory denticles are present at some rows and absent at others. The new collected material of *Compsobuthus khaybari* from Mughera'a showed that some specimens with complete set of external accessory denticles on the movable finger of pedipalp chela (Figs. 4A & 4B) and others with partial presence as shown in (Fig. 3 C).

Acknowledgments

The authors would like to thank Mr. Ibrahim Al Aradi, Mr. Tareq Al Oufi and Jwad Al Oufi for their help in the field. Appreciation is extended to Eng. Abdullah Al Subaee for his help in photography.

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On a small collection of oonopids from Saint Helena with notes on the invalid names "*Xeroonops*" and "*Xeroonops spinipalpis*" (Araneae: Oonopidae)

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Abstract

New faunistic records based on a small number of oonopids collected in Saint Helena are presented. Two unavailable names, "*Xeroonops*" and "*Xeroonops spinipalpis*", previously not remarked on by other authors, are discussed.

Keywords: Araneae, Oonopidae, *Xeroonops*, Saint Helena.

Introduction

The family Oonopidae Simon, 1890 is currently represented on Saint Helena by five species, one is endemic: *Oonops erinaceus* Benoit, 1977 described only from the female, and four are cosmopolitan species introduced to the island: *Heteroonops spinimanus* (Simon, 1892), *Ischnothyreus peltifer* (Simon, 1892), *Opopaea concolor* (Blackwall, 1859), and *Xestaspis parmata* Thorell, 1890. The most recent treatment of the island's oonopids was by Benoit (1977b). In addition to the presently valid *O. erinaceus*, Benoit (1977b) also described *Gamasomorpha atlantica* Benoit, 1977 as new to science, but it was found to be a junior synonym of *O. concolor* by Saaristo & Marusik (2008). The records of *Gamasomorpha insularis* Simon, 1907 reported by Benoit (1977b) are referable to *X. parmata* following the synonymy of *G. insularis* with *X. parmata* by Brescovit *et al.* (2019). The records of *I. peltifer* in Benoit (1977b) need to be revaluated given the World Spider Catalog (2022) currently states they are misidentifications. Similarly, a redescription of *O. erinaceus* is necessary, as is a description of the male.

Whilst recently examining and identifying some oonopid material from Saint Helena in the Natural History Museum, London (NHMUK), we found further specimens of *O. concolor* and *X. parmata* including new site records which are presented herein. We also discuss a previously unnoticed pair of unavailable names in the work of Benoit (1977b). Specimens were examined under a Leica M12.5Z binocular microscope and were identified by the senior author.

Faunistic records

Opopaea concolor (Blackwall, 1859)

Material examined: 1♂ (NHMUK AQ ZOO 2022-84), Prosperous Bay hinterland (Ashmole's Site 18), 930/V, 30/10/2003, coll. P. Ashmole and M. Ashmole; 1♀ (NHMUK AQ ZOO 2022-84), Gill Point Waterfall, above (Ashmole's Site 7), 318/V, 01/10/2003, coll. P. Ashmole and M. Ashmole.

Remarks: A male specimen confirms that this species is still present on Prosperous Bay Plain, and it was collected alongside a female of *X. parmata* (see below). A female collected from Gill Point Waterfall represents a new site record, although one hardly surprising given its proximity to other known sites reported in Benoit (1977b).

Xestaspis parmata Thorell, 1890

Material examined: 1♀ (NHMUK AQ ZOO 2022-84), Prosperous Bay hinterland (Ashmole's Site 18), 930/V, 30/10/2003, coll. P. Ashmole and M. Ashmole; 1♂, 2♀♀ (NHMUK AQ ZOO 2022-84), Gill Point Waterfall, above (Ashmole's Site 7), 319/V, 01/10/2003, coll. P. Ashmole and M. Ashmole.

Remarks: A female specimen collected alongside an aforementioned male of *O. concolor* confirms the continued existence of this species on Prosperous Bay Plain. A male and two females collected from Gill Point Waterfall represent a new site record, although these are again unsurprising given the proximity of previously known sites.

Unavailable names

Whilst consulting the work of Benoit in the many spider chapters he authored (or co-authored) in *La faune terrestre de l'île de Sainte-Hélène. Quatrième partie* it was discovered that two oonopid nomina are listed sporadically in both the introductory chapter (Benoit, 1977a) and his chapter on oonopids (Benoit, 1977b) but for which no descriptions exist. One of these: "... quatre espèces endémiques dont deux appartiennent à un genre endémique. Le caractère endémique du *Zelotes* est équivoque, son cas est parallèle à celui de *Xeroonops* (voir Oonopidae)." (Benoit, 1977a: 18), [=...four endemic species of which two belong to an endemic genus. The endemic character of *Zelotes* is equivocal, its case parallels that of *Xeroonops* (see Oonopidae).] mentions an endemic genus called "*Xeroonops*". A similar statement is found on the proceeding page: "Le cas de *T. solium* semble analogue avec ceux de *Zelotes rusticus* et de *Xeroonops spinipalpis*." (Benoit, 1977a: 19) [= The case of *T. solium* seems analogous with those of *Zelotes rusticus* and *Xeroonops spinipalpis*."] suggesting the new genus contained, at the very least, the taxon "*Xeroonops spinipalpis*". However, the third and final mention of these nomina reveals their true identity. Under the heading presenting findings on the genus *Heteroonops* Dalmas, 1916 one subheading reads: "Espèce-type: *Xeroonops spinipalpis* n. sp." (Benoit, 1977b: 33). In actuality, Benoit (1977b) only redescribes, illustrates, and

discusses *Heteroonops spinimanus* (Simon, 1892), which is the type species of *Heteroonops*. Clearly, Benoit initially thought this oonopid material constituted a new genus and species, but later realised his material was in fact *H. spinimanus*. However, some textual mentions of his proposed new nomina "*Xeroonops*" and "*Xeroonops spinipalpis*" mistakenly remained in the two aforementioned published chapters and thus represent *lapsi* for *Heteroonops* and *H. spinimanus*. These *lapsi* were not noticed by Brignoli (1983), Platnick (2000-2014), nor in any versions of the World Spider Catalog until now (World Spider Catalog, 2022). Therefore, we declare that *Xeroonops* Benoit, 1977 and *Xeroonops spinipalpis* Benoit, 1977 are unavailable names.

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Serket (2022) vol. 19(1): 19-21.

Clubiona golovatchi Mikhailov, 1990 (Araneae: Clubionidae) new record in Türkiye

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Abstract

The Clubionid spider species *Clubiona golovatchi* Mikhailov, 1990 is reported for the first time from Türkiye. The morphological characters and genital organ of the species were photographed. The locality record where the species was collected is indicated.

Keywords: Spider, Clubionidae, *Clubiona*, Turkey.

Introduction

In the Clubionidae, 662 species have been identified in 19 genera in the World (World Spider Catalog, 2022). There are 13 species of genus *Clubiona* Latreille, 1804 and 1 species of genus *Porrhoclubiona* Lohmander, 1944 known in the Turkish fauna (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2022). The new record of *Clubiona golovatchi* Mikhailov, 1990 in this study raises the number of clubionid species known from Türkiye to fifteen.

Nowadays this species is known only from Caucasian region (Armenia, Azerbeijan, Georgia), Russia (Europe) and Iran (Mikhailov, 1990, 2003; Otto, 2022; Zamani *et al.*, 2022; World Spider Catalog, 2022).

Material and Methods

A female sample of *C. golovatchi* was taken from the soil with a spider aspirator and placed in 70% ethanol. The works of Mikhailov (1990, 2003) were consulted for the

identification of this species. SZX7 Olympus stereomicroscope was used to make the identification. The examined specimen was donated to the NÖHUAM (Niğde Ömer Halisdemir University Arachnological Museum).

Results

Clubiona golovatchi Mikhailov, 1990
Clubiona golovatchi Mikhailov, 1990: Holotype ♂ and paratype ♀ from Caucasus, Krasnodar.

Material examined: Niğde Province, Ulukışla District, Alihoca Village 1.160 m, 1♀, 22.06.2022, leg. Sh. Avezbayeva.

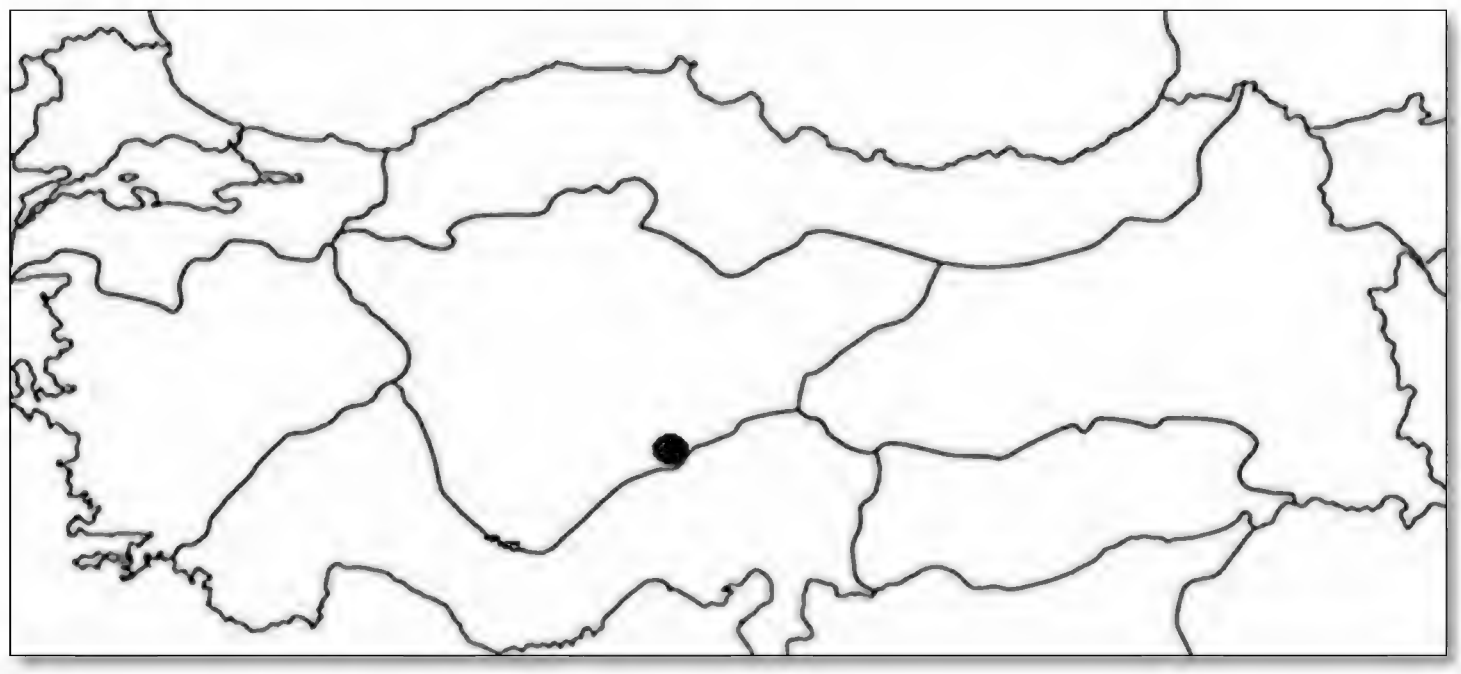
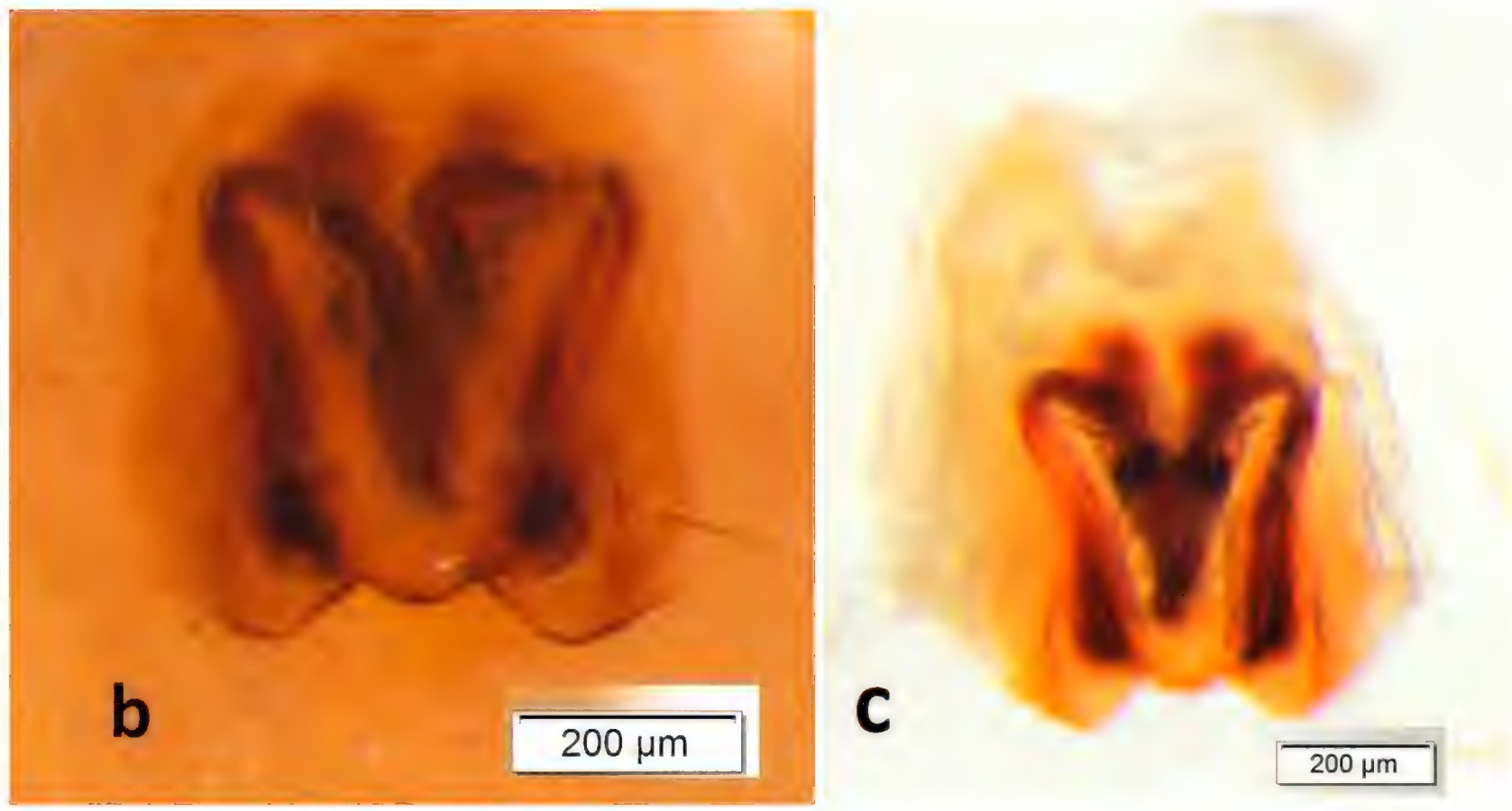


Fig. 1. Locality of *Clubiona golovatchi* Mikhailov, 1990 in Türkiye.

Fig. 2. *Clubiona golovatchi* Mikhailov, 1990 ♀. a. Habitus, dorsal view. b. Epigyne, ventral view. c. Vulvae, dorsal view.



Descriptive notes (♀)**.** Body length 6 mm, prosoma length 2.5 mm, prosoma and chelicerae reddish-brown, legs yellow-orange, opisthosoma length 3.5 mm, reddish brown (Fig. 2a). Epigyne as in Fig. (2b). Vulvae as in Fig. (2c).

Note. This study is a part of the master thesis of the first author.

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New locality records of two rare linyphiids (Araneae: Linyphiidae) in Türkiye

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Abstract

Both *Ceratinella scabrosa* (O. Pickard-Cambridge, 1871) and *Megalepthyphantes turkeyensis* Tanasevitch, Kunt & Seyyar, 2005 species are poorly known in Türkiye. In this study, we could find these species from new localities other than their known localities in Anatolia. The old and new distributions of these species in Türkiye are shown on the maps. Their general habitus and genitalia are also illustrated.

Keywords: Spiders, Linyphiidae, new locality, Anatolia, Turkey.

Introduction

Family Linyphiidae Blackwall, 1859 is the second largest spider family in Order Araneae and is currently represented by 4731 species belonging to 625 genera worldwide (World Spider Catalog, 2022). There are 153 species in 74 linyphiid genera listed for Türkiye (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2022).

Ceratinella scabrosa (O. Pickard-Cambridge, 1871) is known from two localities only in Kastamonu and Sinop Provinces in Black Sea Region (BSR) of Türkiye (Çoşar, 2021). This species is occurring in Europe, Türkiye, Caucasus, and Russia (Europe to Far East) (World Spider Catalog, 2022). The other species, *Megalepthyphantes turkeyensis* Tanasevitch, Kunt & Seyyar, 2005 is known only from one locality, its type locality, in Mersin Province in Mediterranean Region (MER) of Türkiye (Tanasevitch *et al.*, 2005). This species is occurring in Türkiye, Cyprus, and Greece worldwide (World Spider Catalog, 2022). We could find these two species in new localities in Türkiye. Old and new localities of these species are shown on Turkish regional maps.

This paper presents photos of characteristic features and distribution maps of *C. scabrosa* and *M. turkeyensis* species in Türkiye. The new findings about these species widen their distribution in Türkiye.

Material and Methods

In this study, three male specimens of *Ceratinella scabrosa* (O. Pickard-Cambridge, 1871) were collected from Akseki (Antalya Province) in Mediterranean Region of Türkiye and two male specimens of *Megalepthyphantes turkeyensis* Tanasevitch, Kunt & Seyyar, 2005 were collected from Emli Valley, Aladağlar National Park in Niğde Province in Central Anatolia Region. Examined specimens were preserved in 70% ethanol and deposited in the NÖHUAM. For identification: Tanasevitch *et al.* (2005), Tanasevitch (2011), Bosmans *et al.* (2019), and Çoşar (2021) were consulted. The identification was made by means of a SZX61 Olympus stereomicroscope.

The following abbreviations are used: AR = Aegean region, BSR = Black Sea Region, CAR = Central Anatolia Region, EAR = East Anatolia Region, MER = Mediterranean region, MR = Marmara region, NÖHUAM = Niğde Ömer Halisdemir University Arachnology Museum, SAR = South-eastern Anatolia Region.

Results

Ceratinella scabrosa (O. Pickard-Cambridge, 1871) (Fig. 1)

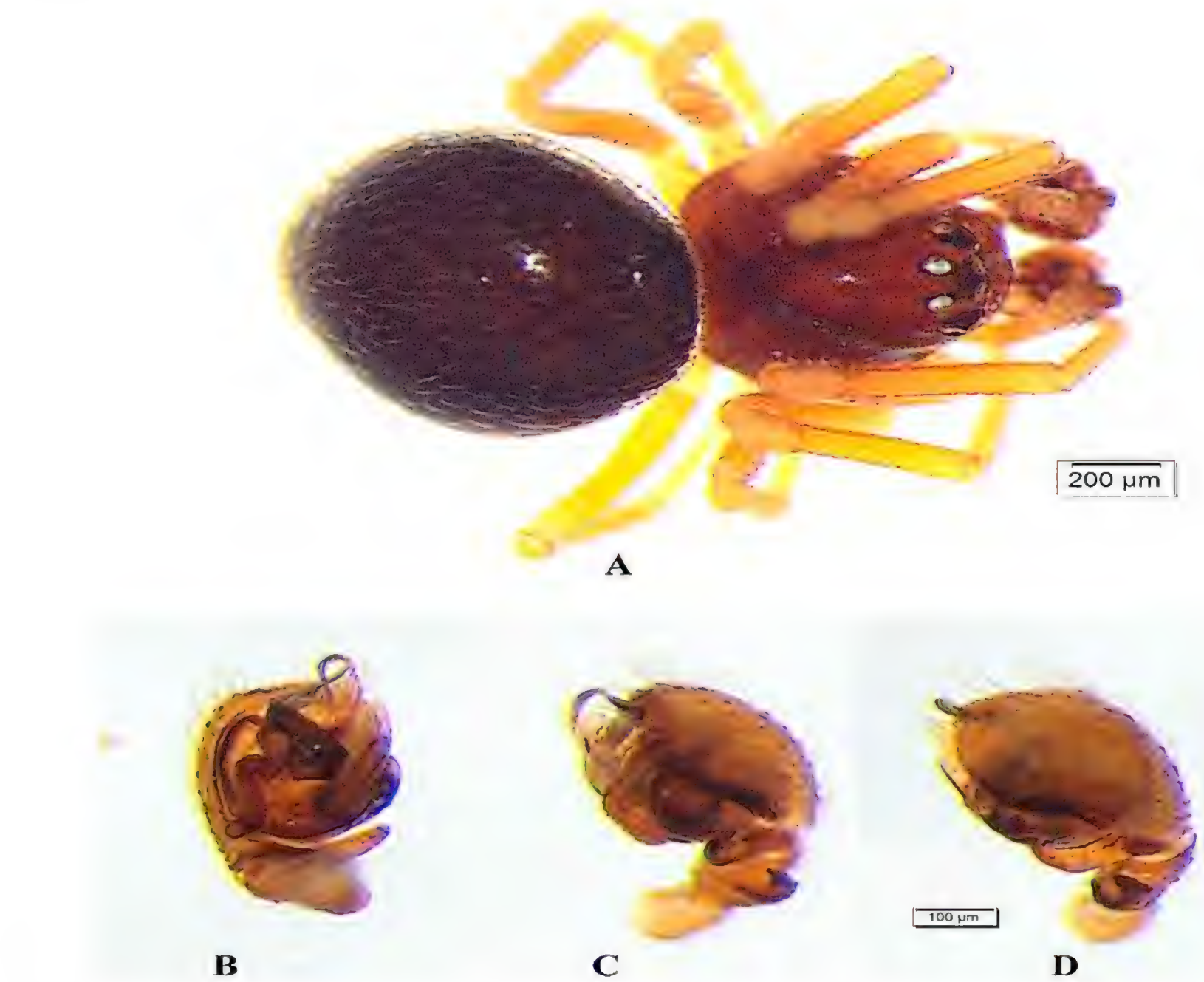

Fig. 1. *Ceratinella scabrosa* (O. Pickard-Cambridge, 1871) ♂. A. Habitus, dorsal view. B-D. Palpal organ. B. ventral view. C-D. retrolateral view.

Synonyms
Walckenaera scabrosa O. Pickard-Cambridge, 1871
Ceratinella scabrosa Simon, 1884
Ceratinella scabrosa Coşar, 2021

For detailed taxonomic references, see World Spider Catalog (2022).

Collected specimens: 3♂♂, Central Anatolia Region: Antalya Province, Akseki district 18.V.2007, deposited in NÖHUAM, leg. Tuncay Türkeş & Hakan Demir.

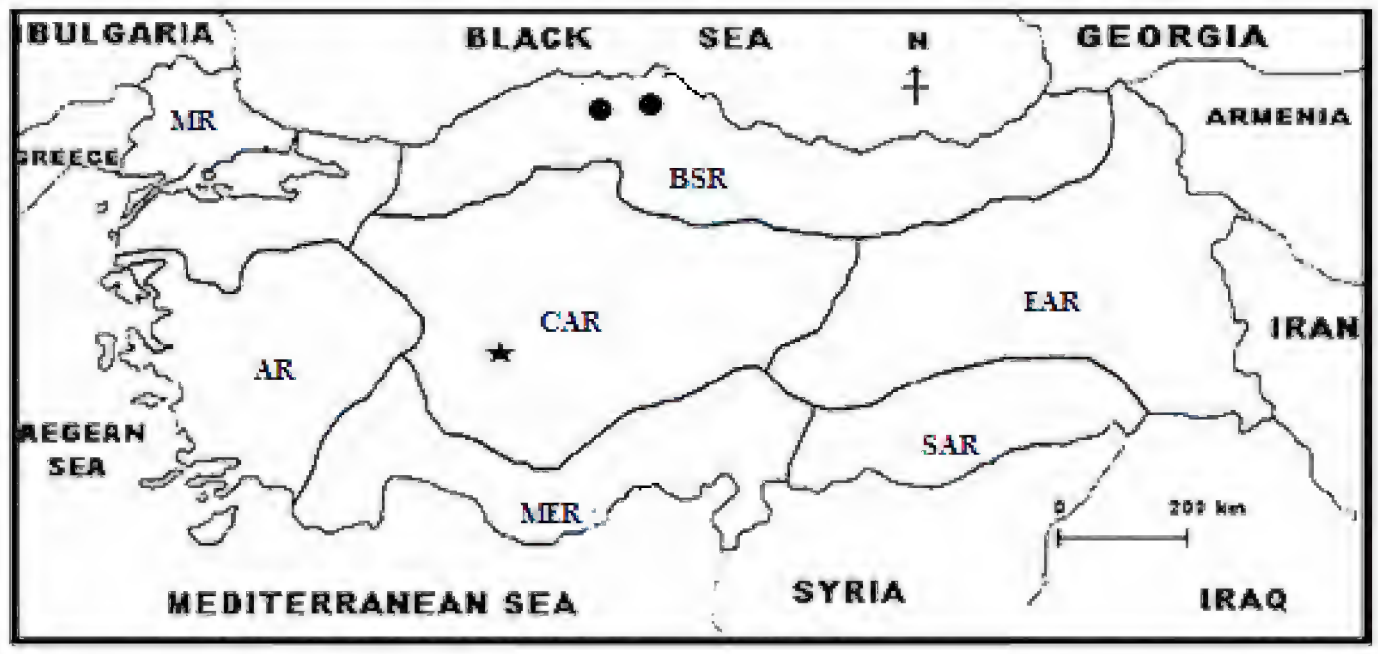

Fig. 2. Localities of *Ceratinella scabrosa* (O. Pickard-Cambridge, 1871). Old localities (●) and new locality (★).

Fig. 3. *Megalepthyphantes turkeyensis* Tanasevitch, Kunt & Seyyar, 2005 ♂. A. Habitus, lateral view. B-D. Palpal organ. B. ventral view. C. retrolateral view. D. prolateral view.

Megalepthyphantes turkeyensis Tanasevitch, Kunt & Seyyar, 2005 (Fig. 3)

Synonyms
Lepthyphantes congener Kulczyński, 1908
Megalepthyphantes turkeyensis Tanasevitch, Kunt & Seyyar, 2005
Megalepthyphantes turkeyensis Tanasevitch, 2011
Megalepthyphantes turkeyensis Bosmans *et al.*, 2019

Collected specimens: 2♂♂, Central Anatolia Region: Emli Valley, Aladağlar Natiaonal Park, (Niğde Province, Çamardı district), 16.V.2015, deposited in NÖHUAM, leg. Tuncay Türkeş & Osman Seyyar.

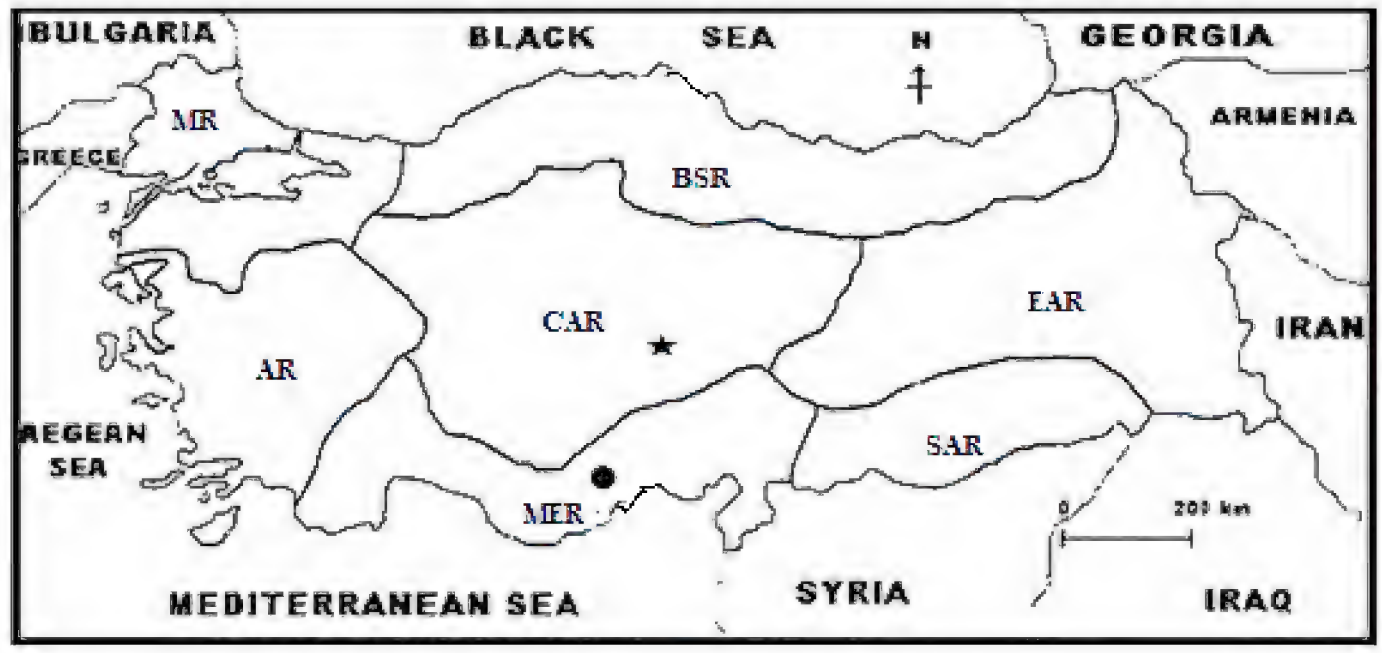

Fig. 4. Localities of *Megalepthyphantes turkeyensis* Tanasevitch, Kunt & Seyyar, 2005. Old locality (●) and new locality (★).

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Serket (2022) vol. 19(1): 26-28.

Leptopilos manolisi (Chatzaki, 2002) (Araneae: Gnaphosidae) new record in Türkiye

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Abstract

The gnaphosid spider species *Leptopilos manolisi* (Chatzaki, 2002) is reported for the first time from Türkiye. Hitherto, there is no other known species of the genus *Leptopilos* Levy, 2009 in the fauna of Türkiye. The new record in this study constitutes the first species of *Leptopilos* known from Türkiye. Morphological and genital organs of the species were photographed. The locality record where the species was collected is indicated.

Keywords: Spider, Gnaphosidae, *Leptopilos*, Turkey.

Introduction

Zoogeographically, Türkiye is an important area because Türkiye's spider fauna largely contains a mixture of the European and the Asiatic. In the Gnaphosidae, 2442 species in 146 genera have been identified in the world (World Spider Catalog, 2022). There are 161 species in 33 genera from this family in Türkiye (Topçu *et al.*, 2005; Seyyar *et al.*, 2009; Demir & Seyyar, 2017; Seyyar & Demir, 2018; Danışman *et al.*, 2022). The new record of *Leptopilos manolisi* (Chatzaki, 2002) in this study raises the number of Gnaphosid species known from Türkiye to 162 in addition to the new record of genus *Leptopilos* Levy, 2009.

Until today, this species, *L. manolisi*, was known only from Greece (Crete) and Israel (Chatzaki *et al.*, 2002; Levy, 2009; World Spider Catalog, 2022).

Material and Methods

A male specimen of *Leptopilos manolisi* (Chatzaki, 2002) was taken from the soil with an aspirator and placed in 70% ethanol. Chatzaki *et al.* (2002) was used for the diagnosis of this species. SZX7 Olympus stereomicroscope was used for identification. The examined specimen was donated to NÖHUAM (Niğde Ömer Halisdemir University Arachnology Museum). The World Spider Catalog (2022) provides information on the distribution of this species.

Results

Leptopilos manolisi (Chatzaki, 2002)
Leptodrassus manolisi Chatzaki, in Chatzaki, Thaler & Mylonas, 2002: 592, f. 70-71 (D♂). Holotype ♂ and paratype ♂ from Greece, Saktouria and Panagia Almyri.
Leptopilos manolisi Levy, 2009: 11, f. 23-26 (T♂ from *Leptodrassus*, D♀).

Material examined: Balıkesir Province, Erdek District, Paşalimanı Island (Fig. 1), 40°28′43″N 27°36′55″E, elevation 40 m, 1♂, 15.08.2021, leg. M.S. Akar.

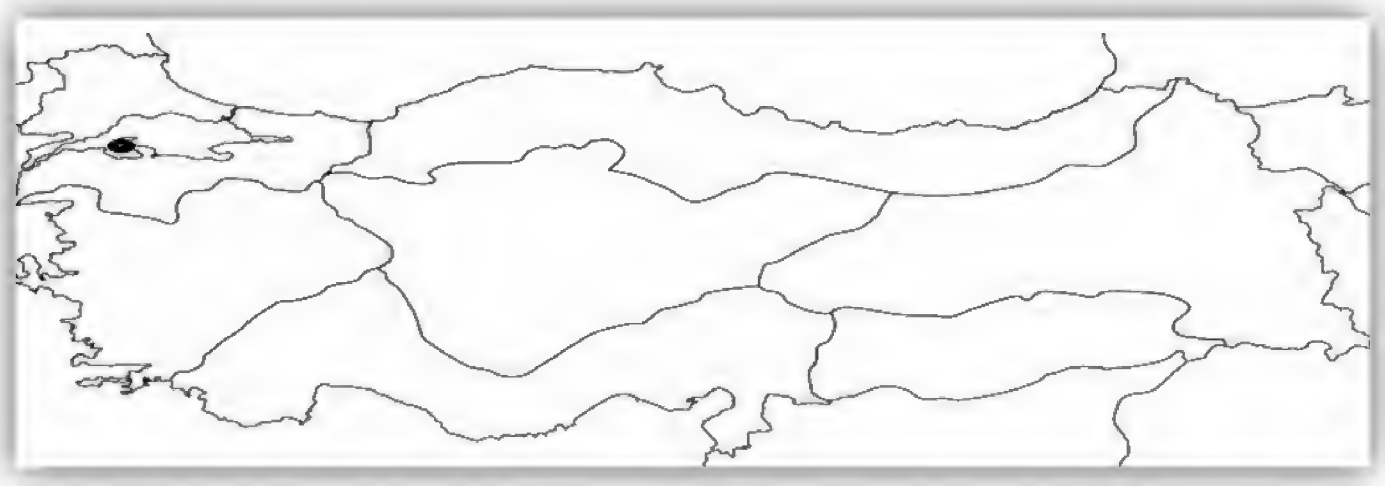

Fig. 1. Locality of *Leptopilos manolisi* (Chatzaki, 2002) in Türkiye.

Description of male: Body length: 2.2 mm, prosoma length 1 mm, opisthosoma length 1.2 mm, colouration of prosoma and legs yellowish, opisthosoma yellowish-gray (Fig. 2a). ♂ Pedipalp: tibial apophysis single-lobed, its anterior angle more prominent and its end more pointed (Fig. 2c). Retrolateral apophysis of bulbus long and separated from the ventral apophysis (Fig. 2b).

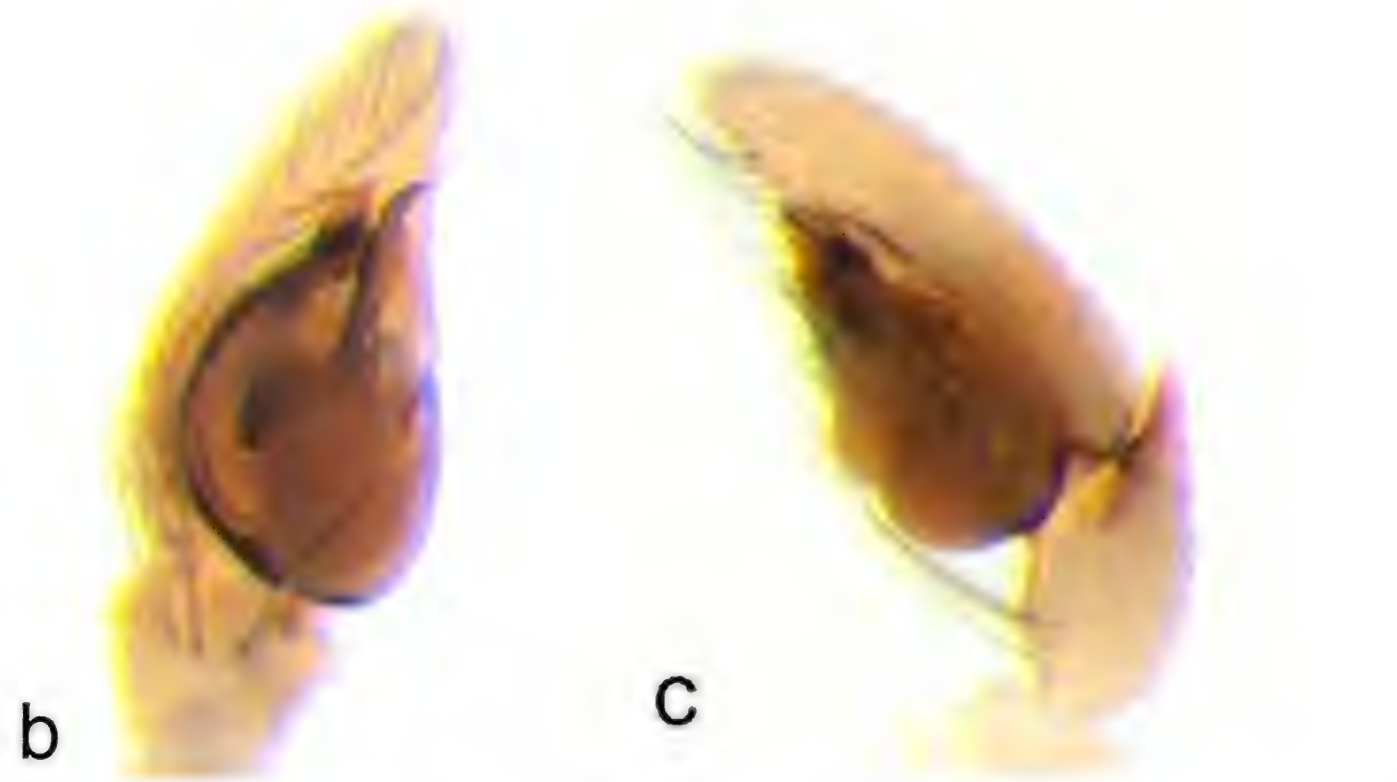

Fig. 2. *Leptopilos manolisi* (Chatzaki, 2002) ♂. a. Habitus, dorsal view. b-c. Pedipalp. b. ventral view. c. retrolateral view.

Note. This study is a part of the master thesis of the first author.

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A new record of *Walckenaeria* in the spider fauna of Türkiye (Araneae: Linyphiidae)

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Abstract

The linyphiid spider species *Walckenaeria stylifrons* (O. Pickard-Cambridge, 1875) is recorded for the first time from Türkiye. In this short paper, the characteristic features and photographs of *Walckenaeria stylifrons* from Türkiye are presented. This increases the total number of Linyphiidae recorded in Türkiye to 154 species.

Keywords: Araneae, Linyphiidae, *Walckenaeria stylifrons*, new record, Turkey.

Introduction

Family Linyphiidae is still not fully studied due to their small body structure and their widespread over the world. They constitute the second most crowded group among all spider families. The sheet weavers spider *Walckenaeria stylifrons* (O. Pickard-Cambridge, 1875) is considerably widespread in Europe and North of the Black sea region and southern European Russia. Until now, no records of this species have been known from Türkiye. Linyphiidae Blackwall, 1859 is one of the 132 spider families known in the world and is one of the families with the most species after Jumping spiders of family Salticidae (World Spider Catalog, 2022). Linyphiidae is represented by 4731 species out of 625 known genera in the world currently described (World Spider Catalog, 2022). Considering the situation of this family in our country, the number of species identified is very low. In Türkiye, 153 species are known in 74 genera (Danışman *et al.*, 2022). This paper deals with the characteristic features and distribution of *Walckenaeria stylifrons* (O. Pickard-Cambridge, 1875) adding a new linyphiid species to the araneo-fauna of Türkiye.

Material and Methods

The present study is based on the material collected from the campus of Kastamonu University. The specimens were found under stones and collected by means of sifter and hand aspirator during the daytime. Specimens were preserved in 70% ethanol. The identification was made with a Leica S8APO microscope and pictures were taken by means of a Leica DC 160 camera. Identification depended on descriptions and drawings of Roberts (1987), Heimer & Nentwig (1991), and Purgat *et al.* (2021). Collected and examined specimens are deposited in the collection of the Zoological Museum of Kastamonu University (KUZM).

Results

Material examined: *Walckenaeria stylifrons* (O. Pickard-Cambridge, 1875): 2♂♂, Kastamonu Province, Türkiye (41.424146 N, 33.769014 E, 10 m), 12.09.2021, leg. Y.S. Damar.

1

2

3

4

Figs. 1-4. *Walckenaeria stylifrons* (O. Pickard-Cambridge, 1875) ♂. 1-2. Habitus. 1. dorsal view. 2. lateral view. 3-4. Pedipalp. 3. retrolateral view. 4. prolateral view. (Scale bars: 0.1 mm)

Morphology: Body length 1.50-1.62; carapace 0.61-0.67 long, 0.50-0.53 wide; opisthosoma 0.86-0.96 long, 0.54-0.61 wide. Overall appearance generally dark, prosoma colour brown-red to brown, cephalic area high and flat. Anterior to cephalic region with

horn-shaped structure consisting of hairs (Figs. 1-2). Legs orange-brown. Opisthosoma brown to dark brown. Pedipalp embolus conspicuous and circular (Figs. 3-4).
Habitat: Found under stones in a pine forest.
Distribution: Palaearctic: Ukraine, Bulgaria, Greece and western parts of Europe, and southern European Russia. This spider is not yet known from Azerbaijan, Georgia, and Armenia (World Spider Catalog, 2022; Nentwig *et al.*, 2022).

Discussion

Genus *Walckenaeria* Blackwall, 1833 includes 195 species, + 2 sub-species, described worldwide (World Spider Catalog, 2022) of which 62 species occur in Europe (Purgat *et al.*, 2021). In Türkiye, this genus is represented by 9 known species (Danışman *et al.*, 2022). The biodiversity in our country is quite high, as it is surrounded by seas on three sides and includes the Mediterranean region, Iran-Turan region, and European Siberia phytogeographic and zoogeographic areas. However, the richness of fauna and flora is still not fully explored.

Family Linyphiidae, known as dwarf spiders or money spiders, are very small spiders. Because of this situation, they are both difficult to identify and difficult to obtain from the habitat and can be concealed very well in vegetation. In some genera and species, the cephalic regions are different from other spiders.

Including the new record listed above, the total number of linyphiid species recorded in Türkiye now is 154 species. The morphometric measurements and other characteristic features of the Turkish specimens of *Walckenaeria stylifrons* are not different from the European specimens.

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Serket (2022) vol. 19(1): 32-35.

A new record of the genus *Pireneitega* (Araneae: Agelenidae) for the Araneo-Fauna of Türkiye

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Abstract

The agelenid spider species *Pireneitega spasskyi* (Charitonav, 1946) is reported for the first time from Türkiye. The morphological characters and genital organ of the species were photographed. The locality record where the species was collected is indicated on a map.

Keywords: Spider, Agelenidae, *Pireneitega*, Turkey.

Introduction

In the Agelenidae, 1371 species in 90 genera have been identified in the world. (World Spider Catalog, 2022). There are 70 species in 15 genera from this family in Türkiye (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2022). The spider genus *Pireneitega* was described by Kishida (1955). So far in Türkiye *Pireneitega armeniaca* (Brignoli, 1978) and *P. cottarellii* (Brignoli, 1978) species were known to exist. *Pireneitega spasskyi* (Charitonov, 1946) is added in this article. The new record in this study raises the number of agelenid species known from Türkiye to seventy one.

Until today, *Pireneitega spasskyi* has been known from Russia, Georgia, and Azerbaijan only (World Spider Catalog, 2022).

Material and Methods

Male and female samples of *Pireneitega spasskyi* (Charitonav, 1946) were collected and preserved in 70% ethanol. The works of Brignoli (1982), Charitonov

(1946), Kovblyuk *et al.* (2013), and Mcheidze (1997) were consulted for the identification of this species. SZX7 Olympus stereomicroscope was used to know the identification. The examined samples were donated to the NÖHUAM (Niğde Ömer Halisdemir University Arachnological Museum).

Results

Family **Agelenidae** C.L. Koch, 1837
Genus ***Pireneitega*** Kishida, 1955
Pireneitega spasskyi (Charitonav, 1946)

Material examined: Giresun Province, Şebinkarahisar District, Eğribel pass 2.226 m, 1♂ 2♀♀, 25.07.2009, leg. T. Türkeş.

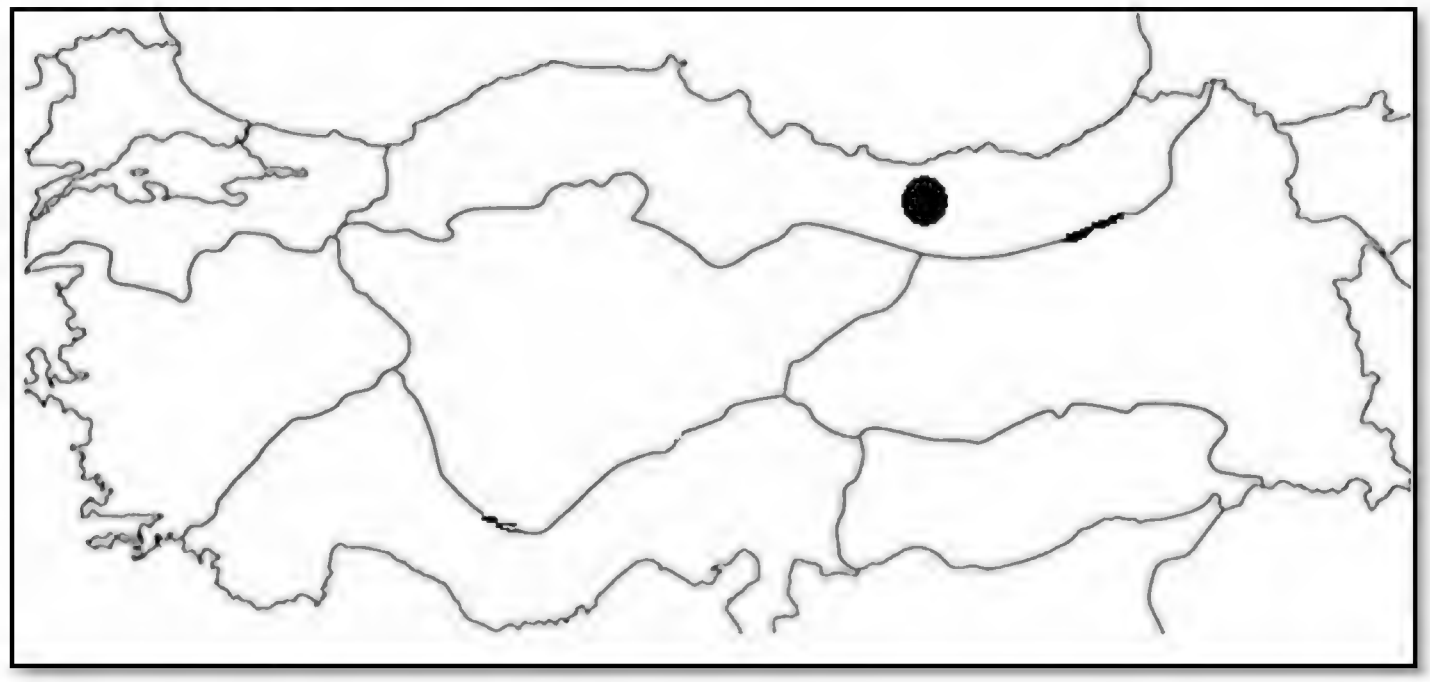

Fig. 1. Locality of *Pireneitega spasskyi* (Charitonav, 1946) in Türkiye.

Fig. 2. *Pireneitega spasskyi* (Charitonav, 1946) ♂ a. Habitus, dorsal view. b. Chelicerae. c-e. Palp. c. retrolateral view. d. ventral view. e. prolateral view.

Descriptive notes of male: Body length 8.5 mm. Carapace is reddish yellow with gray-brown muscle marks, anterior part is dark brown (Fig. 2a). Chelicerae are dark brown, with 3 promarginal and 3 retromarginal teeth (Fig. 2b). Abdomen is dark brown (Fig. 2a). Palp as in Fig. (2c-e).

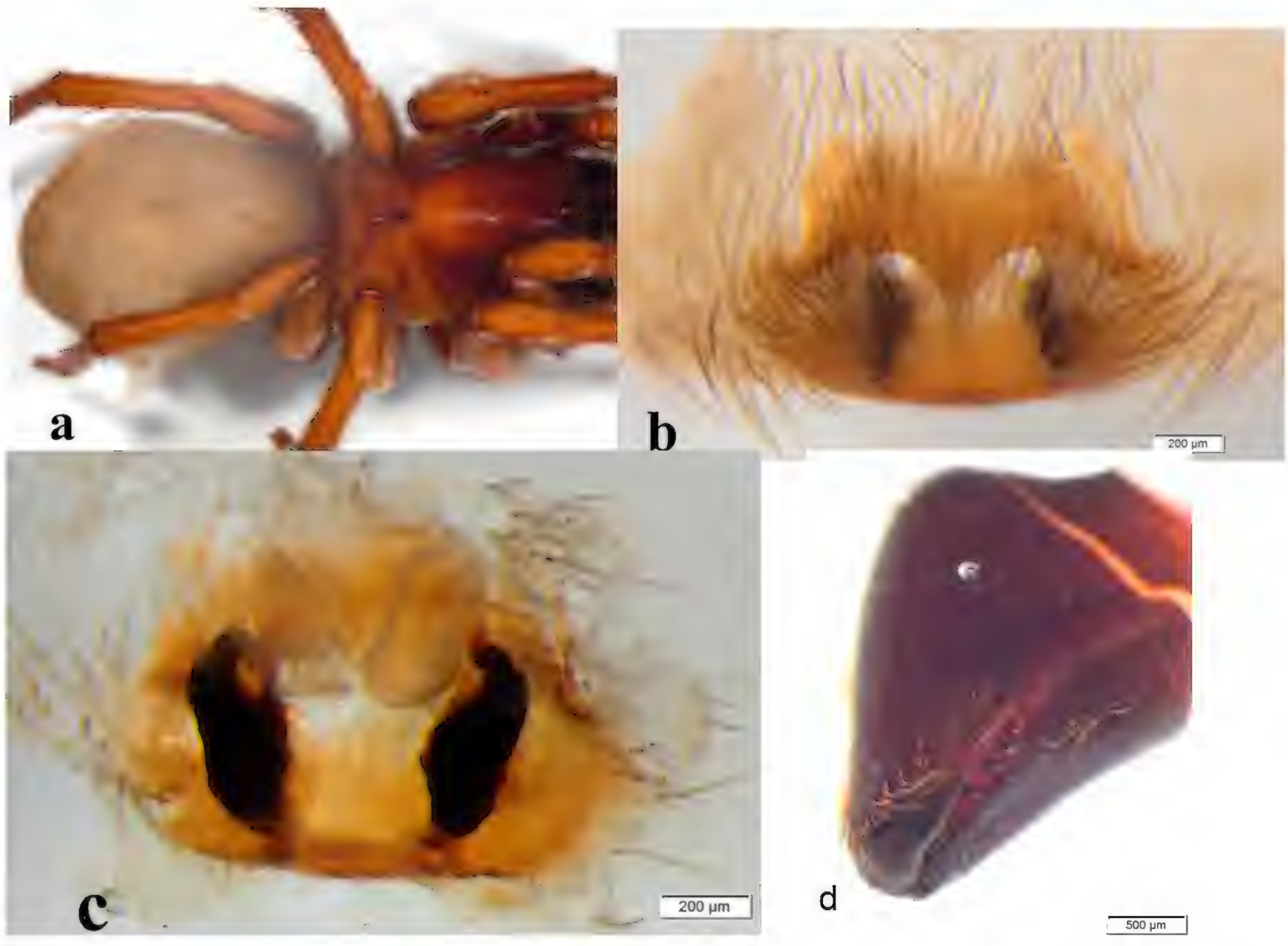

Fig. 3. *Pireneitega spasskyi* (Charitonav, 1946) ♀. a. Habitus, dorsal view. b. Epigyne, ventral view. c. Vulvae, dorsal view. d. Chelicerae.

Descriptive notes of female: Body length 11.5-12 mm. Carapace is reddish yellow, anterior part is dark brown (Fig. 3a). Chelicerae are blackish brown, with 3 promarginal and 3 retromarginal teeth (Fig. 3d). Abdomen is gray brown (Fig. 3a). Epigyne as in Fig. (3b). Vulvae as in Fig. (3c).

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A new record of genus *Lasaeola* from Türkiye (Araneae: Theridiidae)

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Abstract

A new record of genus *Lasaeola* Simon, 1881, *Lasaeola dbari* Kovblyuk, Marusik & Omelko, 2012, is identified as a new record for the Turkish araneofauna. Its morphology is briefly described and illustrated.

Keywords: Araneae, Theridiidae, *Lasaeola*, fauna, new record, Turkey.

Introduction

Theridiidae Sundevall, 1833 is currently represented by 2541 species belonging to 124 genera in the world (World Spider Catalog, 2022). There are 89 species in 33 theridiid genera listed for Türkiye (Danışman *et al.*, 2022). So far, 25 species and one sub species have been described in the genus *Lasaeola*. In Türkiye, this genus includes two species: *Lasaeola coracina* (C.L. Koch, 1837) and *L. tristis* (Hahn, 1833). In the present study, *Lasaeola dbari* Kovblyuk, Marusik & Omelko, 2012 is recorded for the first time from Türkiye. Therefore, the known species of genus *Lasaeola* is raised to 3 in Türkiye.

Material and Methods

One specimen was collected by hand aspirator from Gümüşhane province (Eastern Black Sea Region). It was preserved in 70% ethanol. SZX-16 Olympus stereomicroscope was used during identification. Examined specimen was deposited in Bayburt University, Bayburt, Türkiye (BAYU). World distribution of the new record

follows the World Spider Catalog (2022). Habitus and copulatory organ mainly follow Kovblyuk *et al.* (2012) and Ponomarev & Shmatko (2020).

Results

Lasaeola dbari Kovblyuk, Marusik & Omelko, 2012 (Figs. 1A-D)
Material examined: Türkiye, Gümüşhane Province, Spider Forest and Nature Conservation Areas, Çağlayandibi Waterfall Natural Park, (40°41'04.3"N, 39°03'04.3"E), 894 m., 10.07.2022, 1♀; leg. N. Demircan Aksan.

Description: Female (Figs. 1A-D): Total length 3.0 mm. Carapace 1.0 mm long. Abdomen 2.0 mm long, Colouration: Carapace brown. Abdomen dark brown with two white median bands and four pairs of white transverse stripes. Legs yellowish-brown. Patellae and tibiae I, II and IV darkened distally. Epigyne with bean shaped fovea. Vulvae with long insemination ducts.

Distribution: Russia (Europe), Georgia (World Spider Catalog, 2022).

Fig. 1. *Lasaeola dbari* Kovblyuk, Marusik & Omelko, 2012 ♀. A-B. Habitus. A. dorsal view. B. lateral view. C. Epigyne, ventral view. D. Vulvae, dorsal view. (Scale bars: A-B. 1.0 mm, C-D. 0.1 mm).

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A preliminary checklist of the spider fauna of European Türkiye

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Abstract

A species list of spiders of the European Türkiye region based on unpublished new faunistic information and available literature is presented in this study. As a result of the studies conducted since 1875, a total of 297 species belonging to 34 families were listed from European Türkiye. Part of the list includes new species localities based on specimens collected in the region between 2013 and 2015. With the data of this study, 77 species were recorded for the first time for European Türkiye (Turkish Thrace).

Keywords: Araneae, checklist, fauna, European Turkey.

Introduction

Turkish Thrace or European Türkiye is a small part of the Marmara region in Türkiye, about 3.4% of Türkiye's land area, and constitutes the European part of Türkiye. The area includes all the territories of Edirne, Kırklareli and Tekirdağ provinces as well as those territories in the European part of Çanakkale and İstanbul provinces. Studies on araneofauna of European Türkiye are relatively poor and don't have detailed data when evaluated in terms of studies of araneofauna in Türkiye.

Until now, the spider checklist of European Türkiye has not been prepared as a separate list from the spider checklist of Türkiye. In the available lists, specimens of Turkish Thrace have been evaluated together with the specimens of the Marmara region and have not included details about the species. Localities of species weren't specified in the spider checklists in Türkiye; only the distributions of the species by region were given in these lists (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2022;

Helsdingen, 2013). All published literature works have been reviewed in detail, and the list has taken its final form with the new contributions in this study.

The first contributions to araneofauna of European Türkiye were made by Simon (1875, 1879, 1885), Pavesi (1876, 1878), Kulczyński (1903), Nosek (1905), Drensky (1915, 1936), Fage (1931), and Giltay (1932). In most of these studies, specimens were identified from Istanbul but their localities in Istanbul are not indicated exactly. Contributions to the spider fauna of European Türkiye have continued so far: Karol (1966), Brignoli (1978), De Blauwe (1980), Deeleman-Reinhold & Deeleman (1988), Bosmans &Van Keer (1999), Danışman *et al.* (2011), Özkütük *et al.* (2011, 2012), Helsdingen (2013), Özkütük *et al.* (2013a, 2013b), Demircan (2015), Demircan & Topçu (2016, 2017), Naumova *et al.* (2016), Coşar & Danışman (2018), Dimitrov & Deltshev (2019), Türkeş (2019), Danışman *et al.* (2020), Dimitrov (2020). As a result of the studies conducted since 1875, a total of 297 species are listed.

Material and Methods

Data for the checklist were assembled from available published literature and unpublished species localities and their coordinate data.

All the available literature was reviewed in detail. It was contributed to the list with specimens collected in the European Türkiye region between 2013 and 2015. They were preserved in 70% ethanol and deposited in the Arachnology Museum of Ömer Halisdemir University, Niğde, Türkiye.

The list of collection dates, localities, and coordinate data of the species recorded from Turkish Thrace were given in Table (1) and all species were listed in Table (2). The checklist consists of the Thrace part of the Marmara region as shown in Fig. (1).

Fig. 1. Map of European Türkiye.

Table 1. List of collection dates, localities and coordinate data of the species recorded from Turkish Thrace ("-" not mentioned in the relevant publication).

Location no.	Collection date	Location	Latitude (N)	Longitude (E)	Altitude (m)
1	-	İstanbul, Ayasofya	-	-	-
2	-	İstanbul (exact locality unknown)	-	-	-
3	-	İstanbul, Dolmabahçe	-	-	-
4	-	İstanbul, Belgrad forest	-	-	-
5	04.05.1902	İstanbul, Sarıyer, Büyükdere	-	-	-
6	1909-1914	İstanbul, Çatalca, Gümüşpınar	-	-	-
7		İstanbul, Sinekli	-	-	-
8		İstanbul, Yeniköy	-	-	-
9		Edirne	-	-	-
10		Tekirdağ	-	-	-
11		Tekirdağ, Saray	-	-	-
12		Tekirdağ, Mürefte, Ganos	-	-	-
13		Tekirdağ, Çorlu	-	-	-
14		Kırklareli	-	-	-
15		Kırklareli, Lüleburgaz	-	-	-
16		Yeniköy-Istranca	-	-	-
17		Gümüşpınar-Istranca	-	-	-
18		Istranca	-	-	-
19		Saros-Koru Dağ	-	-	-
20		Keşan-Koru Dağ	-	-	-
21		Edirne, Keşan	-	-	-
22		Türkiye in Europe	-	-	-
23	10.04.1926	İstanbul, Yarımburgaz cave	-	-	-
24	12.06.1931	İstanbul, Sarıyer	-	-	-
25	15.06.1931	İstanbul, Sarıyer, Rumeli Kavağı	-	-	-
26	07.12.1932	İstanbul (exact locality unknown)	-	-	-
27	13.07.1955	İstanbul, Yenikapı	-	-	-
28	19.08.1966	Tekirdağ, Çorlu	-	-	-
29	31.07.1967	Edirne, Yerlisu	-	-	-
30	15.07.1993	Çanakkale, Gökçeada	-	-	-
31	27.09.2002	Kırklareli, Koyunbaba, Koyunbaba cave	41.75°	27.12°	153
32	29.06.2005	Kırklareli, Sarpdere village, Dupnisa cave	41.84°	27.56°	409
33	12.05.2006	İstanbul, Beşiktaş, Ulus	-	-	-
34	25.07.2006	Kırklareli, Sarpdere village, Dupnisa cave	41.84578	27.55997	348
35	10.04.2007	Kırklareli, Koyunbaba, Koyunbaba cave	41.75°	27.12°	153
36	15.04.2007	Kırklareli, Sarpdere, Dupnisa cave	41.84°	27.56°	409
37	16.03.2008	Kırklareli, Sarpdere village, Dupnisa cave	41.84578	27.55997	348
38	29.09.2009	Kırklareli, Demirköy, Sarpdere village	41°51'34.2"	27°34'43.6"	-
39	09.10.2009	Kırklareli, Demirköy, İğneada, Mert Lake	41°51.455	27°57.478	-
40	09.10.2009	Kırklareli, Demirköy, Sislioba village	41°57'44.20"	27°54'36.10"	-
41	27.07.2011	Kırklareli, Vize, Kıyıköy, Selvez bay	41°39'19.98"	28° 5'11.91"	-
42	26.05.2012	Tekirdağ, Pınarca-Safaalan road	41°21'11"	28°03'05"	-
43	26.05.2012	Tekirdağ, Pınarca-Safaalan road	41°21'02"	28°03'15"	-
44	26.05.2012	Tekirdağ, Aydınlar-Hallaçlı road	41°21'44"	28°11'39"	-
45	27.05.2012	Tekirdağ, Saray-Kıyıköy road	41°28'24"	27°57'20"	-
46	27.05.2012	Tekirdağ, Saray-Safaalan road	41°26'17"	28°01'00"	-
47	27.05.2012	Tekirdağ, Safaalan-Pınarca road	44°22'45"	28°05'30"	-
48	28.05.2012	Tekirdağ, Pınarca-Safaalan road	41°21'20"	28°03'30"	-
49	29.05.2012	Tekirdağ, Ormanlı	41°23'50"	28°28'06"	-
50	29.05.2012	Tekirdağ, Yalıköy	41°27'38"	28°20'06"	-
51	30.05.2012	Tekirdağ, Hallaçlı	41°19'41"	28°06'36"	-

52	30.05.2012	Tekirdağ, lake near Hallaçlı	41°19'57"	28°05'54"	-
53	30.05.2012	Tekirdağ, along road east of Hallaçlı	41°18'45"	28°06'41"	-
54	31.05.2012	Tekirdağ, along road Kumbağ-Yeniköy	40°50'56"	27°26'16"	-
55	31.05.2012	Tekirdağ, along road Kumbağ-Yeniköy	40°51'22"	27°27'20"	-
56	01.06.2012	Tekirdağ, small lake in forest along road Pınarca-Safaalan	41°22'00"	28°04'32"	-
57	01.06.2012	Tekirdağ, along road Pınarca-Safaalan	41°21'20"	28°03'32"	
58	13.10.2013	İstanbul, Beşiktaş, Yıldız park	41°04'900"	29°01'548"	-
59	21.10.2013	İstanbul, Fatih, Yedikule dungeons	40°99'512"	28°92'135"	-
60	30.10.2013	İstanbul, Zeytinburnu, Kazlıçeşme square	40°99'329"	28°91'358"	-
61	02.04.2014	İstanbul, Fatih, Yedikule dungeons	40°99'512"	28°92'135"	-
62	26.04.2014	İstanbul, Eyüp, Ayvansaray	41°04'660"	28°93'771"	-
63	05.05.2014	İstanbul, Beşiktaş, Yıldız park	41°04'900"	29°01'548"	-
64	18.05.2014	Edirne, Karaağaç road, Tuna river urban forest	41°66'355"	26°55'206"	-
65	18.05.2014	Edirne, Merkez, Sarayiçi road	41°69'227"	26°55'650"	-
66	19.05.2014	Edirne, Enez, Taşaltı road	40°43'465"	26°05'281"	-
67	19.05.2014	Edirne, Keşan, Kocadere pond vicinity	40°86'627"	26°64'380"	-
68	21.05.2014	İstanbul, Fatih, Yedikule dungeon	40°99'512"	28°92'135"	-
69	23.05.2014	İstanbul, Fatih, Yedikule dungeon	40°99'512"	28°92'135"	-
70	24.05.2014	İstanbul, Beşiktaş, Yıldız park	41°04'900"	29°01'548"	-
71	25.05.2014	Tekirdağ, Saray, Laladere promenade area	41°32'220"	28°00'482"	-
72	25.05.2014	Tekirdağ, Saray, Bahçeköy road	41°54'957"	28°04'824"	-
73	25.05.2014	Tekirdağ, Merkez, Barış & Özgürlük park vicinity	40°98'035"	27°52'804"	-
74	25.05.2014	Tekirdağ, Çerkezköy vicinity	41°31'082"	27°99'845"	-
75	01.06.2014	İstanbul, Fatih, Yedikule dungeons	40°99'512"	28°92'135"	-
76	15.06.2014	İstanbul, Sarıyer, Belgrad forest	41°18'834"	28°98'268"	-
77	29.07.2014	İstanbul, Fatih, Yedikule dungeons	40°99'512"	28°92'135"	-
78	17.08.2014	İstanbul, Fatih, Yedikule dungeons	40°99'512"	28°92'135"	-
79	03.09.2014	Tekirdağ, Şarköy, Gaziköy vicinity	40°74'644"	27°33'084"	-
80	04.09.2014	Tekirdağ, Şarköy, İğdebağları village	40°65'007"	27°14'540"	-
81	13.09.2014	Kırklareli, Demirköy, İğneada, around Erikli lake	41°81'610"	27°97'113"	
82	13.09.2014	Kırklareli, Demirköy, İğneada, around Mert lake	41°86'623"	27°97'220"	
83	13.09.2014	Kırklareli, Demirköy, İğneada, Longoz National Park	41°87'703"	27°98'148"	-
84	13.09.2014	Kırklareli, Demirköy vicinity	41°82'736"	27°76'671"	-
85	14.09.2014	Kırklareli, Vize, Kıyıköy vicinity	41°63'667"	28°09'623"	-
86	22.09.2014	Tekirdağ, Saray, Ayvacık, Küçük Kalaslı cave	41°29'53"	27°55'10"	183
87	22.09.2014	Tekirdağ, Saray, Ayvacık, Küçük Kalaslı cave vicinity	41°29'395"	27°54'237"	179
88	22.09.2014	Tekirdağ, Saray, Koca II cave (Ambar/İsli cave)	41°02'873"	28°58'520"	537
89	23.09.2014	Tekirdağ, Saray, Bahçeköy, Ceneviz cave	41°29'845"	27°55'062"	179
90	23.09.2014	Tekirdağ, Saray, Bahçeköy, Saklısu I, II caves	41°35'09"	28°01'56"	179
91	23.09.2014	Tekirdağ, Saray, Bahçeköy, Saklısu III cave	41°35'14"	28°01'41"	130
92	23.09.2014	Tekirdağ, Saray, Bahçeköy, Saklısu IV cave	41°35'17"	28°01'34"	136
93	24.09.2014	Kırklareli, Vize, Uzuntarla (Domuzdere) cave	41°34'52"	27°57'28"	154
94	24.09.2014	Kırklareli, Vize, Kıyıköy, Kıyıköy cave	41°35'179"	28°01'341"	133
95	24.09.2014	Kırklareli, Vize, Kıyıköy, Yelkenkaya I cave	41°37'197"	28°05'849"	19
96	24.09.2014	Kırklareli, Vize, Kıyıköy, Yelkenkaya II cave	41°38'26"	28°05'50"	11
97	24.09.2014	Kırklareli, Vize, Balkaya, Yenesu cave	41°38'27"	28°05'54"	48
98	25.09.2014	Kırklareli, Vize, Kışlacık, Kovantaşı cave	41°42'349"	27°54'683"	224
99	25.09.2014	Kırklareli, Vize, Kışlacık, Bostanlıktarlası cave	41°41'42"	27°57'17"	179
100	25.09.2014	Kırklareli, Vize, Hamidiye, Kurudere I cave	41°38'12"	27°58'16"	153
101	25.09.2014	Kırklareli, Vize, Hamidiye, Kurudere II cave	41°38'948"	27°58'463"	139
102	26.09.2014	Kırklareli, Vize, Sergen, Bağlar cave	41°43'57"	27°40'40"	470
103	26.09.2014	Kırklareli, Vize, Soğucak, Soğucak cave	41°38'504"	27°39'425"	282

104	26.09.2014	Kırklareli, Vize, Kızılağaç, Kızılağaç cave	41°42'31"	27°54'25"	222
105	29.03.2015	İstanbul, Fatih, Yedikule dungeon	40°99'512"	28°92'135"	-
106	06.04.2015	İstanbul, Beşiktaş, Yıldız park	41°04'900"	29°01'548"	-
107	18.04.2015	Çanakkale, Eceabat, Kabatepe Harbour vicinity	40°12'032"	26°16'248"	7
108	18.04.2015	Çanakkale, Gökçeada, Kaleköy	40°13'059"	25°53'039"	-
109	18.04.2015	Çanakkale: Gökçeada, Yeni Bademli road	40°13'037"	25°54'050"	-
110	19.04.2015	Çanakkale, Gökçeada, Kuzu Harbour vicinity	40°13'723"	25°56'860"	27
111	19.04.2015	Çanakkale, Gökçeada, Merkez	40°11'498"	25°54'390"	71
112	20.04.2015	Çanakkale, Gökçeada, Çınarlı road	40°11'556"	25°54'532"	62
113	27.04.2015	Tekirdağ, Saray, Bozoba Promenade area	41°37'816"	27°89'190"	-
114	27.04.2015	Tekirdağ, Merkez, Barış & Özgürlük park vicinity	40°98'035"	27°52'804"	-
115	04.05.2015	İstanbul, Beşiktaş, Yıldız park	41°04'900"	29°01'548"	-
116	17.05.2015	İstanbul, Fatih, Yedikule dungeon	40°99'512"	28°92'135"	-
117	26.05.2015	Kırklareli, Vize, Hamidiye, Kurudere I cave	41°38'12"	27°58'16"	153
118	26.05.2015	Kırklareli, Vize, Kışlacık, Kovantaşı cave	41°42'349"	27°54'683"	224
119	26.05.2015	Kırklareli, Vize, Hamidiye village, Kurudere vicinity	41°38'948"	27°58'463"	139
120	27.05.2015	Kırklareli, Demirköy, Sarpdere, Dupnisa cave	41°50'676"	27°33'682"	289
121	27.05.2015	Kırklareli, Demirköy, İğneada Longoz National Park	41°53'448"	28°00'050"	10
122	27.05.2015	Kırklareli, Demirköy, Sarpdere village	41°50'676"	27°33'682"	289
123	28.05.2015	Kırklareli, Merkez, Kırklareli Dam vicinity	41°53'487"	27°29'180"	659
124	28.05.2015	Kırklareli, Pınarhisar road	41°44'904"	27°40'236"	714
125	28.05.2015	Kırklareli, Merkez, Armağan village	41°86'528"	27°42'528"	35
126	29.05.2015	Edirne, Lalapaşa, Sinanköy	41°48'744"	26°41'870"	117
127	29.05.2015	Edirne, Süloğlu, Süloğlu Dam vicinity	41°47'572"	27°16'632"	254
128	29.05.2015	Edirne, Süloğlu, Taşlısekban village	41°48'615"	26°51'420"	216
129	29.05.2015	Edirne, Uzunköprü, Alıç village	41°03'739"	26°38'413"	141
130	29.05.2015	Edirne, Uzunköprü, Yeniköy	41°20'809"	26°45'753"	101
131	30.05.2015	Edirne, Enez, Taşaltı road	40°43'465"	26°05'281"	33
132	30.05.2015	Çanakkale, Gökçeada, Yenimahalle	40°12'409"	25°55'389"	136
133	30.05.2015	Çanakkale, Gelibolu, Kocaçeşme village	40°39'945"	26°48'253"	23
134	30.05.2015	Edirne, Keşan, Çelebi village	40°40'496"	26°20'434"	138
135	31.05.2015	Çanakkale, Gökçeada, Eşelek road	40°08'176"	25°56'724"	65
136	31.05.2015	Çanakkale, Gökçeada, Tepeköy road	40°10'262"	25°45'642"	11
137	31.05.2015	Çanakkale, Gökçeada, Aydıncık road	40°11'241"	25°52'815"	166
138	31.05.2015	Çanakkale, Gökçeada, Kokina road	40°06'556"	25°51'048"	81
139	31.05.2015	Çanakkale, Gökçeada, Marmaros vicinity	40°10'262"	25°45'642"	11
140	10.09.2016	Kırklareli, Demirköy village	41°49'24"	27°45'39"	-
141	26.06.2017	Kırklareli, İğneada district	-	-	-

Results

As a result of the studies conducted since 1875, a total of 297 species belonging to 34 families were listed from European Türkiye. Until now, the spider checklist of European Türkiye has not been prepared as a separate checklist from Türkiye as a whole. The localities of the species have not been specified in the spider checklists in Türkiye; only the distributions of the species by region have been given. Therefore, in this study, all the literature is reviewed in detail, and localities and coordinate data of species (if specified) are also included.

With the data of the thesis study carried out between 2013 and 2015, 77 species were recorded for the first time for European Türkiye. These species are indicated by reference number 21 at the end of Table (2).

While there are literature records of many species in the provinces other than the Thrace part of the Marmara region, no literature record of such species has yet been found in the European Türkiye. For this reason, it is expected that the number of species in the Turkish Thrace region will increase with the studies to be carried out.

The current list will also facilitate the comparison of the species of the Turkish Thrace and European countries.

Table 2. A preliminary checklist of the spiders of European Türkiye. All records are included, where numbers in columns indicate the relevant reference listed at the end of the table (Ç: Çanakkale; E: Edirne; İ: İstanbul; K: Kırklareli; T: Tekirdağ, ♀: female/s; ♂: male/s; j: juvenile/s).

Family / Species	**Location numbers (with examined material)**	**Provinces in the Turkish Thrace Region**					**Literature giving the records of each species from Turkish Thrace**
		Ç	**E**	**İ**	**K**	**T**	
AGELENIDAE C.L. Koch, 1837							
Agelena labyrinthica (Clerck, 1757)	2,42(j),84(1♀)			×	×	×	1,3,19,21
* *Histopona breviemboli* Dimitrov, Deltshev & Lazarov, 2017	93(4♂,6♀)				×		21,22,23
Inermocoelotes falciger (Kulczyński, 1897)	140(1♀)				×		26
Inermocoelotes karlinskii (Kulczyński, 1906)	9,98(1♂)		×		×		7,10,21,22,23
Maimuna vestita (C.L. Koch, 1841)	2,26,62(1♀),68(8♀),69(1♂,7♀), 75(1♂,1♀),77(1♀),105(2♂,2♀), 106(1♂),108(5♀),110(3♀), 111(3♂,5♀),112(2♂,2♀), 115(1♂,6♀),116(2♂,12♀),132(1♀)	×		×			1,10,13,21
Tegenaria dalmatica Kulczyński, 1906	68(1♀),69(1♀),95(1♂),116(8♀)			×	×		21,23
Tegenaria domestica (Clerck, 1757)	34(1♂,1♀,5j),94(1♀),110(1♂), 120(2♀)	×			×		21,23,24
Tegenaria euxinica Dimitrov, 2022	69(1♀),76(1♂),88(1♀),89(1♀), 98(1♀),101(1♀)118(6♀)			×	×	×	21,23
Tegenaria faniapollinis Brignoli, 1978	116(2♂,1♀)			×			21,23
Tegenaria hasperi Chyzer, 1897	64(2♂,1♀),65(1♀),76(2♂,4♀)		×	×			21,23
Tegenaria pagana C.L. Koch, 1840	103(3♀)				×		21,23
Tegenaria parietina (Fourcroy, 1785)	2,27,96(1♀),103(2♂,1♀)			×	×		1,10,11,21
AMAUROBIIDAE Thorell, 1870							
Amaurobius erberi (Keyserling, 1863)	64(2♀),68(1♀),87(1♀),88(1♀), 105(1♀),106(5♀)111(2♀), 115(2♂,4♀),116(2♂,3♀)	×	×	×		×	21
Amaurobius ferox (Walckenaer, 1830)	19	×				×	7,10
ANYPHAENIDAE Bertkau, 1878							
Anyphaena accentuata (Walckenaer, 1802)	9		×				7,10
ARANEIDAE Clerck, 1757							
Aculepeira ceropegia (Walckenaer, 1802)	13,16			×	×	×	7,10
Agalenatea redii (Scopoli, 1763)	2,5(♀),6,8,10,11,12,14,50,51,			×	×	×	1,6,7,10,19

	54(4♀)						
Araneus angulatus Clerck, 1757	4(♀,j),17,50,56(2♂,5♀),121(1♀)			×	×	×	5,7,9,10,19,21
Araneus circe (Savigny, 1825)	2			×			1,10
Araneus diadematus Clerck, 1757	9,22,29(j)	×	×	×	×	×	7,10,12
Araneus triguttatus (Fabricius, 1775)	18				×		7,10
Araniella cucurbitina (Clerck, 1757)	2			×			3
Araniella opisthographa (Kulczyński, 1905)	42,56(3♂)					×	19
Argiope bruennichi (Scopoli, 1772)	2,13,28(♀),29(♀)		×	×		×	1,3,10,12
Argiope lobata (Pallas, 1772)	2,13			×			1,10
Cercidia prominens (Westring, 1851)	55(1♀)					×	19
Cyclosa conica (Pallas, 1772)	8,17,22,50(2♀),76(1♀)	×	×	×	×	×	7,10,19,21
Cyclosa sierrae Simon, 1870	6,8,17,18,70(4♀)			×	×		7,10,21,23
Gibbaranea bituberculata (Walckenaer, 1802)	2,8,17,71(1♀),107(1♂,2♀), 109(1♀),112(2♂),121(1♀)	×		×	×	×	1,7,10,21,23
Hypsosinga albovittata (Westring, 1851)	43(1♂),125(1♀)				×	×	19,21
Hypsosinga heri (Hahn, 1831)	52(1♀)					×	19
Hypsosinga pygmaea (Sundevall, 1831)	79(1♀),113(3♀),127(1♀)		×			×	21,23
Hypsosinga sanguinea (C.L. Koch, 1844)	71(1♂),121(1♂)				×	×	21
Larinioides cornutus (Clerck, 1757)	2,8,13,18,127(3♂,5♀)		×	×	×	×	3,7,10,21
Larinioides suspicax (O. Pickard-Cambridge, 1876)	49,52,56(1♂,6♀)					×	19
Mangora acalypha (Walckenaer, 1802)	2,8,15,17,19,42,46,47,55, 56(4♂,7♀),64(1♀),65(1♂),66(1♂), 70(1♀),71(5♂,28♀),72(2♂,5♀), 73(3♀),74(1♂),76(3♀),83(1♀), 119(1♂,3♀),121(1♂,7♀),123(1♀), 125(1♂,1♀),132(1♀)	×	×	×	×	×	3,7,10,19,21
Neoscona adianta (Walckenaer, 1802)	8,9,13,14,17,67(1♂,3♀),71(5♀), 73(1♀),125(2♀),127(2♂,3♀), 130(1♀),134(2♂,4♀),135(4♀)	×	×	×	×	×	7,10,21
Neoscona byzanthina (Pavesi, 1876)	2			×			1,4,10
Neoscona subfusca (C.L. Koch, 1837)	2,29(♂),69(1♂)		×	×			1,10,12,21
Nuctenea umbratica (Clerck, 1757)	6,14,53(1♀,j)			×	×	×	7,10,19
Singa nitidula C.L. Koch, 1844	13					×	7,10
Zilla diodia (Walckenaer, 1802)	17,76(2♀),121(1♀)			×	×		7,10,21,23
CHEIRACANTHIIDAE Wagner, 1887							
Cheiracanthium elegans Thorell, 1875	2,123(2♂),127(1♀)		×	×	×		3,10,21
Cheiracanthium erraticum (Walckenaer, 1802)	13					×	7,10
Cheiracanthium mildei L. Koch, 1864	13, 61(1♂),75(2♀),76(1♀),115(1♂)			×		×	7,10,21
Cheiracanthium pelasgicum (C.L. Koch, 1837)	2,5(♀)			×			3,6
CLUBIONIDAE Wagner, 1887							
Clubiona brevipes Blackwall, 1841	49(1♂)					×	19
Clubiona comta C.L. Koch, 1839	76(3♀)			×			21
Clubiona pallidula (Clerck, 1757)	13,14				×	×	7,10
Clubiona pseudoneglecta Wunderlich, 1994	48(1♂)					×	19

Clubiona terrestris Westring, 1851	76(1♀)			×			21
DICTYNIDAE O. Pickard-Cambridge, 1871							
Argyroneta aquatica (Clerck, 1757)	39				×		20b
Brigittea civica (Lucas, 1850)	65(1♂),71(1♂)		×			×	21
Brigittea innocens (O. Pickard-Cambridge, 1872)	43,47,54,57(5♂,4♀)					×	19
Brigittea latens (Fabricius, 1775)	125(1♂)				×		21
Dictyna arundinacea (Linnaeus, 1758)	8,44,47,48,51,56,57(10♀)			×		×	7,10,19
Dictyna uncinata Thorell, 1856	9,13,17,41(1♂,3♀),43,49(1♂,2♀), 76(3♀)		×	×	×	×	7,10,18,19,21
Lathys humilis (Blackwall, 1855)	45(1♀),76(3♀)			×		×	19,21
DYSDERIDAE C.L. Koch, 1837							
Dysdera crocata C.L. Koch, 1838	2,59(1♀),69(1♀),77(1♀),78(1♀), 80(1♀),116(2♂,3♀),130(1♀)		×	×		×	14,21
Dysdera erythrina (Walckenaer, 1802)	9		×				7,10
Dysdera westringi O. Pickard-Cambridge, 1872	116(2♂,4♀),131(1♀)		×	×			21
Harpactea babori (Nosek, 1905)	70(1♀),115(3♂,2♀)			×			21
Harpactea clementi Bosmans, 2009	116(1♂)			×			21,22
Harpactea strandjica Dimitrov, 1997	89(1♀)					×	21,22
ERESIDAE C.L. Koch, 1845							
Eresus walckenaeri Brullé, 1832	132(1♂)	×					21
GNAPHOSIDAE Banks, 1892							
Anagraphis ochracea (L. Koch, 1867)	73(1♀)					×	21,22
Aphantaulax trifasciata (O. Pickard-Cambridge, 1872)	135(1♀)	×					21
Civizelotes caucasius (L. Koch, 1866)	128(1♂),135(1♀)	×	×				21
Drassodes lapidosus (Walckenaer, 1802)	2,6,8,9,18,48(1♂),65(1♂,1♀), 71(2♀),112(1♂),124(2♂),132(3♀), 136(1♀)	×	×	×	×	×	1,7,10,19,21
Drassodes lutescens (C.L. Koch, 1839)	135(4♀)	×					21
Drassodes pubescens (Thorell, 1856)	8,14,18,48(1♀),129(1♀),137(2♀)	×	×	×	×	×	7,10,19,21
Drassyllus crimeaensis Kovblyuk, 2003	71(3♀)					×	22,23
Drassyllus lutetianus (L. Koch, 1866)	9		×				7,10
Drassyllus praeficus (L. Koch, 1866)	65(3♂),69(1♂,7♀),71(2♀),72(1♂), 129(1♀),132(1♀)	×	×	×		×	21
Drassyllus pusillus (C.L. Koch, 1833)	9		×				7,10
Gnaphosa lucifuga (Walckenaer, 1802)	9,17		×	×	×		7,10
Gnaphosa montana (L. Koch, 1866)	8,14,18			×	×		7,10
Haplodrassus minor (O. Pickard-Cambridge, 1879)	17			×	×		7,10
Haplodrassus signifer (C.L. Koch, 1839)	14,17,110(1♂)	×		×	×		7,10,21
Haplodrassus umbratilis (L. Koch, 1866)	7,16,17			×	×		7,10
Micaria albovittata (Lucas, 1846)	16			×	×		7,10
Micaria pulicaria (Sundevall, 1831)	83(1♂)				×		21
Nomisia aussereri (L. Koch, 1872)	2			×			1,10
Nomisia exornata (C.L. Koch, 1839)	6,8,9,13,18,59(1♀),68(1♂,1♀),	×	×	×	×	×	7,10,21

	128(1♀),132(2♂,2♀),133(2♀), 135(1♀),136(4♂,2♀)						
Nomisia ripariensis (O. Pickard-Cambridge, 1872)	132(2♂),135(1♂)	×					23
Phaeocedus braccatus (L. Koch, 1866)	19,130(1♂)		×				7,10,21
Scotophaeus blackwalli (Thorell, 1871)	70(1♀)			×			21
Trachyzelotes pedestris (C.L. Koch, 1837)	17			×	×		7,10
Zelotes subterraneus (C.L. Koch, 1833)	17			×	×		7,10
Zelotes tenuis (L. Koch, 1866)	78(1♀),111(1♀)	×		×			21
HAHNIIDAE Bertkau, 1878							
Cicurina cicur (Fabricius, 1793)	89(1♀)					×	21
LINYPHIIDAE Blackwall, 1859							
Bathyphantes gracilis (Blackwall, 1841)	66(1♂)		×				21
Centromerus albidus Simon, 1929	55(1♀)					×	19
Centromerus petrovi Dimitrov & Deltshev, 2019	34(1♂,7♀),37(1♀)				×		27
Centromerus valkanovi Deltshev, 1983	106(1♀)			×			21,22
Cresmatoneta mutinensis (Canestrini, 1868)	48(1♀)					×	19
Diplostyla concolor (Wider, 1834)	65(1♀)		×				21
Dismodicus bifrons (Blackwall, 1841)	141(1♂)				×		28
Entelecara acuminata (Wider, 1834)	49(1♀)					×	19
Erigone dentipalpis (Wider, 1834)	18				×		7,10
Frontinellina frutetorum (C.L. Koch, 1835)	6,7,8,13,18,43,46,53(1♂,4♀), 71(4♀),76(1♀),81(1♀),121(1♂,1♀), 134(6♀)		×	×	×	×	10,19,21
Gnathonarium dentatum (Wider, 1834)	67(1♂),115(1♀)		×	×			21
Gonatium nemorivagum (O. Pickard-Cambridge, 1875)	38(1♂,1♀)				×		29
Ipa terrenus (L. Koch, 1879)	129(1♂)		×				21
Lepthyphantes leprosus (Ohlert, 1865)	35(1♀),75(1♂),88(1♂),102(1♂,7♀)			×	×	×	21,24
Linyphia triangularis (Clerck, 1757)	18				×		7,10
Microlinyphia pusilla (Sundevall, 1830)	67(1♀),73(1♀)		×			×	21
Neriene furtiva (O. Pickard-Cambridge, 1871)	64(1♀),110(1♀)	×	×				21
Neriene radiata (Walckenaer, 1841)	76(1♀)			×			21
Ostearius melanopygius (O. Pickard-Cambridge, 1880)	68(1♀),77(1♀)			×			21
Palliduphantes byzantinus (Fage, 1931)	23(2♂,1♀)			×			8
Porrhomma convexum (Westring, 1851)	35(1♀),36(2♂,1♀),86(1♂,1♀), 90(1♀),102(1♂),118(1♂,1♀)				×	×	21,23,24
Prinerigone vagans (Savigny, 1825)	13,51(1♂),67(1♂),68(1♂)		×	×		×	7,10,19,21
Sintula retroversus (O. Pickard-Cambridge, 1875)	40(3♀)				×		17
Syedra gracilis (Menge, 1869)	35(1♂,2♀)				×		24
Tenuiphantes flavipes (Blackwall, 1854)	76(1♂,4♀)			×			21
Tenuiphantes tenuis (Blackwall, 1852)	54(1♂),71(1♀),85(1♀)				×	×	19,21
Trichoncus affinis Kulczyński, 1894	141(1♂)				×		28
LYCOSIDAE Sundevall, 1833							

Alopecosa aculeata (Clerck, 1757)	19	×				×	7,10
Alopecosa albofasciata (Brullé, 1832)	2,48,57(2♀),65(1♀),66(1♀),69(3♂) 70(1♂,1♀),77(1♀),83(9♀),113(1♂)		×	×	×	×	1,10,19,21
Alopecosa cuneata (Clerck, 1757)	13,18					×	7,10
Alopecosa pulverulenta (Clerck, 1757)	2,48(2♀)			×		×	1, 3,7,10,19
Alopecosa taeniopus (Kulczyński, 1895)	59(1♂)			×			21
Alopecosa trabalis (Clerck, 1757)	8,11,16,17,19	×		×		×	7,10
Arctosa cinerea (Fabricius, 1777)	10					×	7,10
Arctosa leopardus (Sundevall, 1833)	48,56(3♀),112(1♂)	×				×	19,21
Arctosa perita (Latreille, 1799)	2			×			3
Arctosa tbilisiensis Mcheidze, 1946	131(1♂)		×				21
Arctosa variana C.L. Koch, 1847	5			×			6
Aulonia albimana (Walckenaer, 1805)	71(1♀),124(1♀)				×	×	21
Aulonia kratochvili Dunin, Buchar & Absolon, 1986	48(1♂,3♀),110(2♂)	×				×	19,21
Geolycosa vultuosa (C.L. Koch, 1838)	2			×			1,10
Hogna radiata (Latreille, 1817)	2,4(♂),8,9,13,65(1♂),121(1♀)		×	×	×	×	1,3,5,10,21
Lycosa praegrandis C.L. Koch, 1836	20,21		×			×	7,10
Pardosa amentata (Clerck, 1757)	6,9,13,18		×	×	×	×	7,10
Pardosa hortensis (Thorell, 1872)	42,43,48,57(6♀),71(1♂,16♀),72(6♀) 113(2♂,6♀),119(1♀),121(11♀)				×	×	19,21
Pardosa lugubris (Walckenaer, 1802)	71(13♀),72(1♂,3♀),119(2♀)				×	×	21
Pardosa morosa (L. Koch, 1870)	6,18			×		×	7,10
Pardosa prativaga (L. Koch, 1870)	48(2♀)					×	19
Pardosa proxima (C.L. Koch, 1847)	5(♀),42,43,48,57(7♀),65(1♀), 71(1♀),83(8♀),112(3♂,2♀), 114(1♂),129(1♀),130(1♀)	×	×	×	×	×	6, 19, 21
Pardosa riparia (C.L. Koch, 1833)	5(♀)			×			6
Pardosa tatarica (Thorell, 1875)	139(3♀)	×					21
Pirata tenuitarsis Simon, 1876	48,57(1♂,4♀)					×	19
Piratula knorri (Scopoli, 1763)	119(7♀)				×		21,22
Piratula latitans (Blackwall, 1841)	48,57(1♂,1♀)					×	19
Trabea paradoxa Simon, 1876	48(1♂,1♀)					×	19
Trochosa hispanica Simon, 1870	116(1♀),119(1♂,1♀)			×	×		21
Trochosa ruricola (De Geer, 1778)	22	×	×	×	×	×	7,10
Trochosa terricola Thorell, 1856	71(1♀)					×	21
Xerolycosa nemoralis (Westring, 1861)	13,15				×	×	7,10
MIMETIDAE Simon, 1881							
Ero aphana (Walckenaer, 1802)	76(1♂,1♀),134(1♀)		×	×			21
MITURGIDAE Simon, 1886							
Zora nemoralis (Blackwall, 1861)	48(2♀)					×	19
NESTICIDAE Simon, 1894							
Nesticus cellulanus (Clerck, 1757)	31(2♀,1j),34(1♂,3♀,3j),86(1♀), 90(1♂,2♀),91(4♀),98(5♀), 101(2♂,2♀),102(6♀),104(2♀), 117(1♂,1♀),118(2♂,1♀),120(2♀)				×	×	21,24

OECOBIIDAE Blackwall, 1862							
Oecobius maculatus Simon, 1870	77(1♀),116(1♂),132(1♀),137(1♀)	×		×			21
OXYOPIDAE Thorell, 1869							
Oxyopes heterophthalmus (Latreille, 1804)	43,46,48,51,57(11♂,6♀,j),71(1♂, 1♀),123(2♂,4♀),130(1♂,3♀)		×		×	×	19,21
Oxyopes lineatus Latreille, 1806	3(♀),22,42,43,46,51,57(12♂,j), 65(1♀),71(1♂,4♀),81(1♀),123(4♂)	×	×	×	×	×	5,7,10,19,21
PHILODROMIDAE Thorell, 1870							
Philodromus albidus Kulczyński, 1911	76(1♀)			×			21
Philodromus aureolus (Clerck, 1757)	9,45(1♀),75(1♂,1♀),76(3♀)		×	×		×	7,10,19,21
Philodromus cespitum (Walckenaer, 1802)	15,45,49,54(3♂)				×	×	7,10,19
Philodromus collinus C.L. Koch, 1835	6,8,13			×		×	7,10
Philodromus dispar Walckenaer, 1826	9,17,49(1♀),76(1♀),121(1♀)			×	×	×	7,10,19,21
Philodromus poecilus (Thorell, 1872)	113(2♀)					×	21
Philodromus rufus Walckenaer, 1826	17			×	×		7,10
Pulchellodromus pulchellus (Lucas, 1846)	66(1♂,1♀),68(2♂,1♀),73(2♂,4♀), 130(1♂)		×	×		×	21
Thanatus vulgaris Simon, 1870	9,135(2♀)	×	×				7,10,21
Tibellus macellus Simon, 1875	13,42,56,57(3♂,6♀),68(1♂,1♀), 73(5♂,4♀)			×		×	7,10,19,21
Tibellus oblongus (Walckenaer, 1802)	44,48,49,52(3♂,7♀),66(1♂),67(1♂), 74(1♂),79(1♀),113(1♀)		×			×	19,21
PHOLCIDAE C.L. Koch, 1850							
Holocnemus pluchei (Scopoli, 1763)	9,64(2♀),65(2♂,2♀),68(3♂,8♀), 69(1♀),75(1♀),78(1♂),80(1♀),84 (2♂,2♀),85(2♀),103(2♀),108(1♀), 126(1♂,2♀),131(2♂,1♀),135(1♀)	×	×	×	×	×	10,21
Hoplopholcus forskali (Thorell, 1871)	120(1♀),122(1♀)				×		21
Hoplopholcus trakyaensis Demircan & Topçu, 2017	86(1♂),89(1♂,2♀),90(3♂,3♀),91 (1♀),92(1♂,3♀),97(7♂),98(6♂,3♀), 100(2♀),101(9♂,3♀),104(3♂,3♀), 117(3♂,6♀),118(2♂,3♀)				×	×	21,25
Pholcus opilionoides (Schrank, 1781)	16			×		×	7,10
Pholcus phalangioides (Fuesslin, 1775)	58(1♀),80(1♀),88(3♂,2♀), 96(3♂,4♀),103(7♂,1♀),126(1♀)		×	×	×	×	21
Spermophora senoculata (Dugès, 1836)	64(1♀)		×				21
PHRUROLITHIDAE Banks, 1892							
Phrurolithus festivus (C.L. Koch, 1835)	66(1♂),76(1♀)		×	×			21
PISAURIDAE Simon, 1890							
Pisaura mirabilis (Clerck, 1757)	2,4(♀),8,15,18,19,48,56(3♀), 71(1♀),73(1♀),107(1♀),112(1♂), 116(1♂,1♀),128(1♀)	×	×	×	×	×	1,5,7,10,19,21
SALTICIDAE Blackwall, 1841							
Aelurillus v-insignitus (Clerck, 1757)	7,9,13,17		×	×	×	×	7,10
Attulus distinguendus (Simon, 1868)	65(1♀)		×				21
Ballus chalybeius (Walckenaer, 1802)	68(1♀),76(1♀),115(1♂)			×			21
Carrhotus xanthogramma (Latreille, 1819)	5,17			×	×		6,7,10
Chalcoscirtus infimus (Simon, 1868)	133(2♀)	×					21

Cyrba algerina (Lucas, 1846)	132(1♂),135(2♀)	×					21
Euophrys frontalis (Walckenaer, 1802)	17,60(1♀),70(2♂,1♀),76(1♀)			×	×		7,10,21
Evarcha arcuata (Clerck, 1757)	6,8,9,13,18,42,45,47,51,56,57(10♂, 1♀,j),66(1♂),71(3♂),83(4♂,1♀)		×	×	×	×	7,10,19,21
Evarcha falcata (Clerck, 1757)	9		×				7,10
Evarcha jucunda (Lucas, 1846)	49(1♂,1♀),63(1♂),75(1♂),83(2♂), 85(1♂),116(1♀)			×	×	×	19,21
Habrocestum egaeum Metzner, 1999	68(2♂)			×			21
Habrocestum papilionaceum (L. Koch, 1867)	66(1♂)		×				21
Heliophanus aeneus (Hahn, 1832)	16			×	×		7,10
Heliophanus auratus C.L. Koch, 1835	82(1♂)				×		21
Heliophanus cupreus (Walckenaer, 1802)	11,17,42,43,45,51,56(6♂,4♀), 70(1♂),71(1♂,5♀),72(1♂),113(1♂), 119(2♀),121(1♂)			×	×	×	7,10,19,21
Heliophanus dubius C.L. Koch, 1835	17			×	×		7,10
Heliophanus edentulus Simon, 1871	65(6♂,2♀),68(1♂)		×	×			21
Heliophanus equester L. Koch, 1867	67(1♂),73(9♂,8♀),123(1♂),130(2♀),131(1♂),134(2♂,1♀)		×		×	×	21
Heliophanus flavipes (Hahn, 1832)	9		×				7,10
Heliophanus kochii Simon, 1868	54(2♀),65(1♂),66(2♂),68(1♀), 69(1♀),85(1♂),124(1♀),132(3♀)	×	×	×	×	×	19,21
Heliophanus melinus L. Koch, 1867	54(3♀),66(4♀),123(1♀),124(1♀), 125(1♂,2♀),131(3♀),132(5♀), 137(1♀)	×	×		×	×	19,21
Heliophanus patagiatus Thorell, 1875	9		×				7,10
Heliophanus tribulosus Simon, 1868	46(1♀)					×	19
Icius hamatus (C.L. Koch, 1846)	70(1♂)			×			21
Leptorchestes mutilloides (Lucas, 1846)	17			×	×		7,10
Macaroeris nidicolens (Walckenaer, 1802)	48(1♂)					×	19
Marpissa muscosa (Clerck, 1757)	89(1♂)					×	21
Menemerus semilimbatus (Hahn, 1829)	65(1♂,2♀),80(1♀),112(1♂)	×	×			×	21
Mogrus neglectus (Simon, 1868)	65(1♂),134(1♂,1♀)		×				21
Myrmarachne formicaria (De Geer, 1778)	9,17		×	×	×		7,10
Pellenes diagonalis (Simon, 1868)	67(1♂)		×				21
Pellenes nigrociliatus (Simon, 1875)	13,18				×	×	7,10
Philaeus chrysops (Poda, 1761)	2,9,10,14,127(1♂),131(3♀), 132(1♀),134(1♂),137(1♀)	×	×	×	×	×	1,7,10,21
Phlegra bresnieri (Lucas, 1846)	2			×			1
Phlegra fasciata (Hahn, 1826)	6,8,9,10,18,65(1♂),67(1♂),74(1♂), 113(1♂)		×	×	×	×	7,10,21
Plexippus paykulli (Audouin, 1825)	116(1♂)			×			21
Pseudeuophrys obsoleta (Simon, 1868)	136(1♀)	×					21
Pseudeuophrys vafra (Blackwall, 1867)	61(3♀),70(6♂,12♀),106(2♀), 115(3♂,1♀)			×			21,22
Saitis tauricus Kulczyński, 1905	61(6♂,1♀),64(1♂),68(1♂,5♀), 70(15♂,6♀),80(1♀),106(4♂,3♀), 115(8♂,6♀)		×	×		×	21
Salticus mutabilis Lucas, 1846	65(2♂,1♀),68(3♂,2♀),70(4♂), 75(2♀),115(5♂)		×	×			21

Synageles dalmaticus (Keyserling, 1863)	24(1♂)			×			9,10
SCYTODIDAE Blackwall, 1864							
Scytodes thoracica (Latreille, 1802)	40(2♀),58(1♀),70(1♀),73(1♂),80(1♀),115(4♀),119(1♂)			×	×	×	20a,21
SEGESTRIIDAE Simon, 1893							
Segestria senoculata (Linnaeus, 1758)	6,70(3♀),115(1♀)			×			7,10,21
SPARASSIDAE Bertkau, 1872							
Eusparassus walckenaeri (Audouin, 1825)	138(1♀)	×					21
Micrommata ligurina (C.L. Koch, 1845)	67(1♂)		×				21
Micrommata virescens (Clerck, 1757)	9,18,20		×		×	×	7,10
TETRAGNATHIDAE Menge, 1866							
Meta bourneti Simon, 1922	34(2♀),86(2♂,1♀),88(1♀),89(1♂,3♀),93(1♂,2♀),98(2♂,2♀),99(1♀),102(5♀),104(2♀),118(1♀)				×	×	21,24
Meta menardi (Latreille, 1804)	36(1j)				×		24
Metellina mengei (Blackwall, 1869)	6			×			7,10
Metellina merianae (Scopoli, 1763)	1,4(♀),32(1♀,1j),34(1♀,3j),35(1♀),76(1♂),86(1♂,4♀),89(2♀),90(1♂,2♀),91(1♂,3♀),92(2♀),98(2♀),99(1♂,1♀),100(1♂,3♀),102(1♂,6♀),104(1♀),118(1♂,3♀)			×	×	×	2,5,21,24
Pachygnatha degeeri Sundevall, 1830	13,83(8♂,4♀)				×	×	7,10,21
Tetragnatha extensa (Linnaeus, 1758)	2,3(♀),6,13,18,49,51,52(3♂,5♀),65(2♀),66(1♂,1♀),71(10♂,14♀),72(1♀),76(1♂),81(1♀),82(1♂,1♀),83(1♀),84(1♀),85(1♀),125(1♂),127(5♂,6♀)		×	×	×	×	3,5,7,10,19,21
Tetragnatha intermedia Kulczyński, 1891	49(1♂,3♀)					×	19
Tetragnatha montana Simon, 1874	51(1♀)					×	19
THERIDIIDAE Sundevall, 1833							
Anelosimus pulchellus (Walckenaer, 1802)	17			×		×	7,10
Anelosimus vittatus (C.L. Koch, 1836)	50(1♂),70(1♂),119(1♀),121(1♂,1♀)			×	×	×	19,21
Asagena phalerata (Panzer, 1801)	63(1♂),67(1♂),70(1♂),108(1♀),113(1♂),114(1♂),115(2♂),128(1♀),136(1♀)	×	×	×		×	21
Crustulina guttata (Wider, 1834)	55(1♀,j)					×	19
Crustulina scabripes Simon, 1881	70(1♂,2♀),115(1♀)			×			21
Dipoena melanogaster (C.L. Koch, 1837)	45,53(13♀)					×	19
Enoplognatha afrodite Hippa & Oksala, 1983	57(1♂)					×	19
Enoplognatha mandibularis (Lucas, 1846)	2,68(1♀)			×			1,21
Enoplognatha ovata (Clerck, 1757)	22,42(2♂,j),73(1♂),76(16♂,5♀)	×	×	×	×	×	7,10,19,21
Enoplognatha parathoracica Levy & Amitai, 1981	2(1♀)			×			15
Enoplognatha quadripunctata Simon, 1885	2(2♀)			×			15
Enoplognatha thoracica (Hahn, 1833)	71(1♂)					×	21
Episinus truncatus Latreille, 1809	76(1♂,2♀)			×			21
Euryopis episinoides (Walckenaer, 1847)	54(2♀),66(1♀),73(1♀),79(3♂,2♀),80(2♂),106(1♀),110(8♂,5♀),	×	×	×		×	19,21

	111(1♂,1♀),112(1♀),115(1♂)						
Heterotheridion nigrovariegatum (Simon, 1873)	54(1♂),65(1♀)		×			×	19,21
Kochiura aulica (C.L. Koch, 1838)	54,55(5♂,5♀),121(1♂)				×	×	19,21
Neottiura bimaculata (Linnaeus, 1767)	43(1♂),71(1♂)					×	19,21
Neottiura uncinata (Lucas, 1846)	66(1♀)		×				21
Paidiscura pallens (Blackwall, 1834)	17			×		×	10
Parasteatoda lunata (Clerck, 1757)	17,45,49,50,51,53,56(7♂,7♀),70 (2♂,10♀),72(1♀),76(1♀),115(1♀)			×		×	10,19,21
Parasteatoda tepidariorum (C.L. Koch, 1841)	60(2♀),61(1♀),63(1♀),68(1♂,1♀), 70(2♀),75(1♀),76(4♂,3♀),78(5♂, 5♀),95(1♀),105(1♀),115(1♀)			×	×		21
Phylloneta impressa (L. Koch, 1881)	9		×				10
Phylloneta sisyphia (Clerck, 1757)	9		×				10
Platnickina tincta (Walckenaer, 1802)	14,45,55(2♂,3♀),76(1♂,1♀), 121(1♀)			×	×	×	7,10,19,21
Sardinidion blackwalli (O. Pickard-Cambridge, 1871)	68(1♂),69(1♂),71(1♀)			×		×	21
Simitidion simile (C.L. Koch, 1836)	43,46(5♂),68(1♀)			×		×	19,21
Steatoda albomaculata (De Geer, 1778)	2,3(♀),9		×	×			1,5,7,10
Steatoda grossa (C.L. Koch, 1838)	5(♀),60(1♀),63(1♀)			×			6,21
Steatoda paykulliana (Walckenaer, 1806)	2,6,18,19,71(1♀),110(1♀),112(3♀)	×		×		×	1,7,10,21
Steatoda triangulosa (Walckenaer, 1802)	2,9,18,64(1♀),78(2♀),79(1♀), 94(3♀)115(1♀),116(1♀)		×	×	×	×	1,7,10,21
Theridion adrianopoli Drensky, 1915	9,106(1♂),111(1♀),135(1♀)	×	×	×			7,10,21
Theridion melanurum Hahn, 1831	17,64(1♀),65(1♀),112(6♀), 114(1♂,1♀),115(1♂,1♀)	×	×	×		×	10,21
Theridion mystaceum L. Koch, 1870	71(4♀),73(1♂),76(2♀),111(2♂)	×		×		×	21
Theridion pinastri L. Koch, 1872	42(1♂)					×	19
Theridion varians Hahn, 1833	45,46,53(2♂,2♀),76(9♀)			×		×	19,21
THERIDIOSOMATIDAE Simon, 1881							
Theridiosoma gemmosum (L. Koch, 1877)	25(1♀)			×			9,10
THOMISIDAE Sundevall, 1833							
Bassaniodes bufo (Dufour, 1820)	2			×			1
Ebrechtella tricuspidata (Fabricius, 1775)	85(1♂)				×		21
Heriaeus hirtus (Latreille, 1819)	2			×			1,10
Heriaeus orientalis Simon, 1918	3(♂)			×			5
Heriaeus setiger (O. Pickard-Cambridge, 1872)	71(1♀)					×	21
Heriaeus simoni Kulczyński, 1903	42,47,51(4♂)					×	19
Misumena vatia (Clerck, 1757)	2,9,18,71(1♂)	×	×	×	×	×	1,7,10,21
Monaeses israeliensis Levy, 1973	43,57(6♂,3♀)					×	19
Ozyptila confluens (C.L. Koch, 1845)	80(1♂),83(1♂),115(1♀)			×	×	×	21,22
Pistius truncatus (Pallas, 1772)	2,49(1♀)			×		×	3,19
Psammitis sabulosus (Hahn, 1832)	2			×			1,10
Runcinia grammica (C.L. Koch, 1837)	3(♀),52(2♂,j),74(2♀),134(1♂)		×	×		×	5,19,21
Synema anatolicum Demir, Aktaş & Topçu,	54(3♂,3♀)					×	19

2009							
Synema globosum (Fabricius, 1775)	2,74(2♀),121(1♂),123(1♂), 127(3♂,2♀)		×	×	×	×	1,21
Thomisus onustus Walckenaer, 1805	2,3(♀),57(1♂),65(1♀),66(1♀), 67(1♀),72(1♀),81(1♀),109(1♀)	×	×	×	×	×	1,5,19,21
Tmarus stellio Simon, 1875	119(1♀)				×		21
Xysticus acerbus Thorell, 1872	2,9,42,57(2♀)		×	×		×	1,7,10,19
Xysticus audax (Schrank, 1803)	112(1♀)	×					21
Xysticus cristatus (Clerck, 1757)	9,14,19	×	×		×	×	7,10
Xysticus kempeleni Thorell, 1872	113(1♂,1♀)					×	21
Xysticus kochi Thorell, 1872	2,9,13,17,62(1♀),66(1♀),70(1♀), 113(1♂),127(1♀)		×	×	×	×	1,10,21
Xysticus lanio C.L. Koch, 1835	49(1♀)					×	19
Xysticus lineatus (Westring, 1851)	2			×			3
Xysticus luctuosus (Blackwall, 1836)	14				×		7,10
TITANOECIDAE Lehtinen, 1967							
Nurscia albomaculata (Lucas, 1846)	2			×			1
Titanoeca quadriguttata (Hahn, 1833)	64(1♀),67(1♀),136(1♀),137(1♀)	×	×				21,22
Titanoeca schineri L. Koch, 1872	13,65(1♀)		×			×	7,10,21
ULOBORIDAE Thorell, 1869							
Hyptiotes paradoxus (C.L. Koch, 1834)	83(1♂)				×		21
Uloborus walckenaerius Latreille, 1806	43,46,47,56,57(4♂,4♀),70(6♀), 79(1♀)			×		×	19,21
ZODARIIDAE Thorell, 1881							
Zodarion imroz Dimitrov, 2020	30(1♂)	×					30
Zodarion morosum Denis, 1935	65(1♂),71(1♀),128(2♀),129(1♂, 1♀),130(1♀),132(1♂,3♀),133(2♀), 135(2♀),136(1♀),137(1♀)	×	×			×	21
ZOROPSIDAE Bertkau, 1882							
Zoropsis spinimana (Dufour, 1820)	33(♂)			×			16

* Species has been previously recorded as *Textrix chyzeri* by Demircan & Topçu (2015) which is a misidentification (Dimitrov *et al.*, 2017).

Relevant references belonging to records of each species from Turkish Thrace:

1. Pavesi (1876); 2. Pavesi (1878); 3. Simon (1879); 4. Simon (1885); 5. Kulczyński (1903); 6. Nosek (1905); 7. Drensky (1915); 8. Fage (1931); 9. Giltay (1932); 10. Drensky (1936); 11. Karol (1966); 12. Brignoli (1978); 13. De Blauwe (1980); 14. Deeleman-Reinhold & Deeleman (1988); 15. Bosmans & Van Keer (1999); 16. Danışman *et al.* (2011); 17. Özkütük *et al.* (2011); 18. Özkütük *et al.* (2012); 19. Helsdingen (2013); 20. Özkütük *et al.* (2013a), (2013b); 21. Demircan (2015); 22. Demircan & Topçu (2015); 23. Demircan & Topçu (2016); 24. Naumova *et al.* (2016); 25. Demircan & Topçu (2017); 26. Coşar & Danışman (2018); 27. Dimitrov & Deltshev (2019); 28. Türkeş (2019); 29. Danışman *et al.* (2020); 30. Dimitrov (2020).

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An overview of Turkish gnaphosid fauna-II (Araneae: Gnaphosidae)

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Abstract

Türkiye has a rich spider biodiversity as other living groups due to its zoogeographical position. Since many studies have been carried out in Türkiye to detect ground spiders by this time. It has been necessary to compile these studies to determine the total Gnaphosidae fauna periodically. According to all data, family Gnaphosidae is the most dominant spider family in Türkiye and it contains 163 taxa in total.

Keywords: Spider, Gnaphosidae, fauna, Turkey.

Introduction

Türkiye has rich biodiversity and this richness depends on various ecological conditions, various geological formations, and different climates. It is possible to see this richness in spider fauna as well as other living groups in the country. Currently, 161 species and 2 subspecies belonging to 33 genera are known from Türkiye (Topçu *et al.*, 2005; Demir & Seyyar, 2017; Danışman *et al.*, 2022).

Although studies of the araneofauna of Türkiye began at the end of the 19th century, the spider fauna of Türkiye is still little known. Gnaphosidae Banks, 1892, commonly known as ground spiders, is the sixth largest spider family with a global distribution, comprising 2442 extant species belonging to 146 genera (World Spider Catalog, 2022). Although Gnaphosidae is the largest family in Türkiye, the number of taxonomic studies dealing with it is still limited. On the contrary, ground spider is the most investigated family between all spider families in Türkiye. The first data on Turkish gnaphosids were characterized by brief visits made by non-Turkish scientists (Karol,

1967). From 1967 to 2018, six checklists/list were published for ground spiders of Türkiye (Karol, 1967; Bayram, 2002; Topçu *et al.*, 2005; Seyyar *et al.*, 2009; Demir & Seyyar, 2017; Seyyar & Demir, 2018) (Fig. 1). The aim of this study is to review all the literature of family Gnaphosidae in the country and to reveal the status of the ground spider fauna.

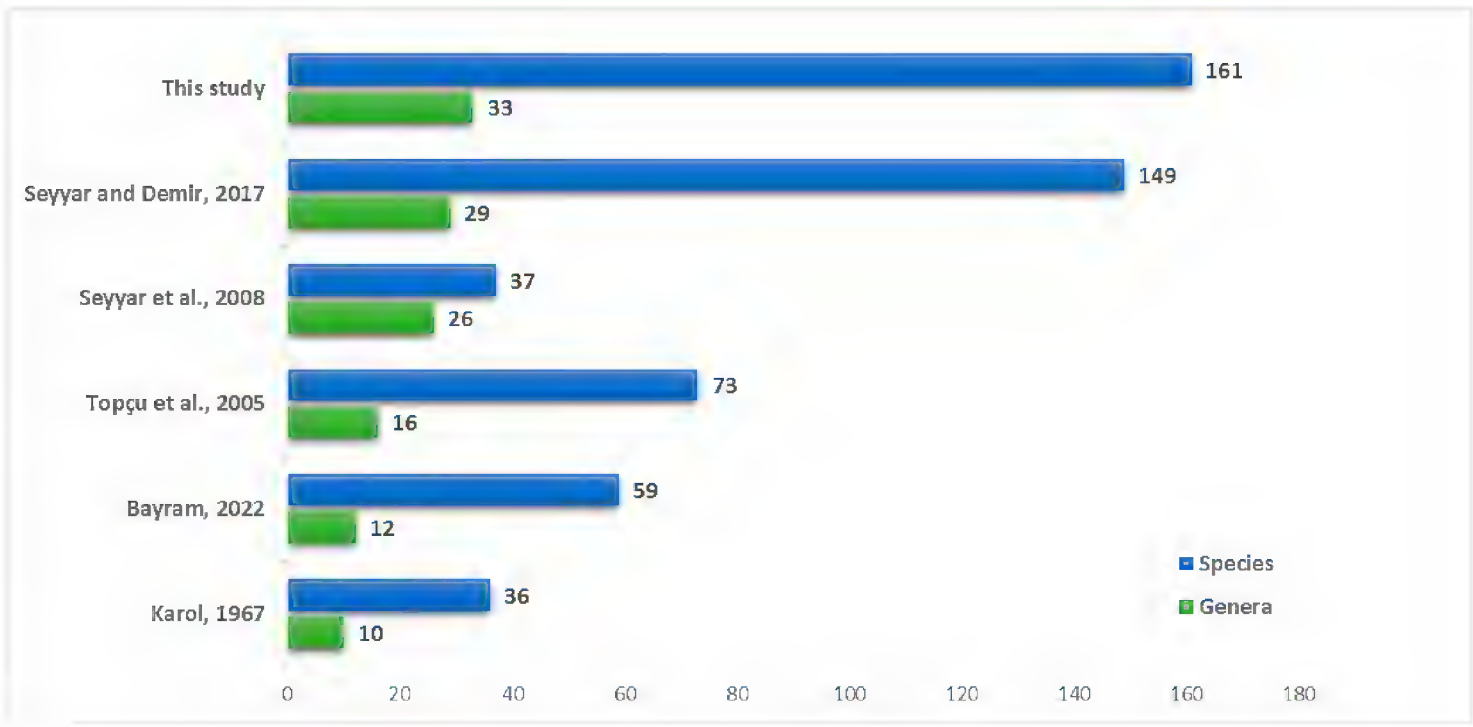

Fig. 1. The numbers of Turkish gnaphosid genera and species in preceding lists and in this study.

Method

In this study, all works in the literature about family Gnaphosidae in Türkiye were compiled. Theses and scientific meetings are not formal publications and are consequently not considered herein.

Used abbreviations of the geographical areas in Türkiye: AR = Aegean Region, BSR = Black Sea Region (WBR+MBR+EBR), CAR = Central Anatolia Region, EAR = East Anatolia Region, EBR = East Black Sea Region, MBR = Middle Black Sea Region, MER = Mediterranean Region, MR = Marmara Region, SAR = Southeast Anatolia Region, WBR = West Black Sea Region.

Results and Discussion

As a result of literature reviews, a total of 161 ground spider species belonging to 33 genera were listed in Türkiye. All taxa and their references are listed in Table (1).

Table 1. Updated list of ground spider species in Türkiye.
(Species, localities, and references new to the list are shown in bold.)

Gnaphosidae - Species	References	Localities in Türkiye
Anagraphis ochracea (L. Koch, 1867)	Seyyar & Demir, 2018	MR
Anagraphis pallens Simon, 1893	Seyyar & Demir, 2018	MER, CAR
Aphantaulax cincta (L. Koch, 1866)	Seyyar & Demir, 2018	MER
Aphantaulax trifasciata (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	CAR, AR
Aphantaulax trifasciata trimaculata Simon, 1878	Seyyar & Demir, 2018	CAR
Berinda amabilis Roewer, 1928	Seyyar & Demir, 2018	CAR
Berinda cooki Logunov, 2012 *	Seyyar & Demir, 2018; **Lecigne, 2021**	MER
Berinda ensigera (O. Pickard-Cambridge, 1874)	Seyyar & Demir, 2018	AR, MER, CAR

Berinda hakani Chatzaki & Seyyar, 2010 *	Seyyar & Demir, 2018	CAR
***Berlandina nabozhenkoi* Ponomarev & Tsvetkov, 2006**	**Seyyar & Demir, 2020b**	**CAR**
Berlandina plumalis (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	CAR
Berlandina pulchra (Nosek, 1905) *	Seyyar & Demir, 2018	CAR
Callilepis cretica (Roewer, 1928)	Seyyar & Demir, 2018	CAR
Callilepis nocturna (Linnaeus, 1758)	Seyyar & Demir, 2018	CAR
***Callilepis schuszteri* (Herman, 1879)**	**Seyyar & Demir, 2021**	**CAR**
Cesonia aspida Chatzaki, 2002	Seyyar & Demir, 2018	MER
Civizelotes caucasius (L. Koch, 1866)	Seyyar & Demir, 2018	CAR, EAR, SAR
Civizelotes gracilis (Canestrini, 1868)	Seyyar & Demir, 2018	EAR
Civizelotes solstitialis (Levy, 1998)	Seyyar & Demir, 2018	CAR
Cryptodrassus creticus Chatzaki, 2002	Seyyar & Demir, 2018; **Çoşkun *et al.*, 2022**	MER, **MBR**
Drassodes bifidus Kovblyuk & Seyyar, 2009 *	Seyyar & Demir, 2018	MER, CAR
Drassodes caspius Ponomarev & Tsvetkov, 2006	Seyyar & Demir, 2018	AR, CAR
Drassodes cupreus (Blackwall, 1834)	Seyyar & Demir, 2018	MER
Drassodes difficilis (Simon, 1878)	Seyyar & Demir, 2018	CAR
Drassodes lacertosus (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	MER, CAR
Drassodes lapidosus (Walckenaer, 1802)	Seyyar & Demir, 2018	MR, MER, CAR, EAR, SAR
Drassodes lutescens (C.L. Koch, 1839)	Seyyar & Demir, 2018	MER, CAR, EAR, SAR
Drassodes pubescens (Thorell, 1856)	Seyyar & Demir, 2018	MER, CAR, EAR, SAR
Drassodes serratichelis (Roewer, 1928)	Seyyar & Demir, 2018	MER
Drassodes similis Nosek, 1905 *	Seyyar & Demir, 2018	CAR
Drassodes villosus (Thorell, 1856)	Seyyar & Demir, 2018	CAR, EAR
Drassodex hypocrita (Simon, 1878)	Seyyar & Demir, 2018	MER
Drassyllus crimeaensis Kovblyuk, 2003	Seyyar & Demir, 2018	MER
Drassyllus dadia Komnenov & Chatzaki, 2016	Seyyar & Demir, 2018	CAR
Drassyllus jubatopalpis Levy, 1998	Seyyar & Demir, 2018	MER
Drassyllus lutetianus (L. Koch, 1866)	Seyyar & Demir, 2018	EAR, SAR
Drassyllus praeficus (L. Koch, 1866)	Seyyar & Demir, 2018	CAR, EAR, SAR
Drassyllus pumilus (C.L. Koch, 1839)	Seyyar & Demir, 2018	CAR, EAR
Drassyllus pusillus (C.L. Koch, 1833)	Seyyar & Demir, 2018	CAR, AR
Drassyllus sur Tuneva & Esyunin, 2003	Seyyar & Demir, 2018	MER
Drassyllus villicus (Thorell, 1875)	Seyyar & Demir, 2018	EAR
Drassyllus vinealis (Kulczyński, 1897)	Seyyar & Demir, 2018	CAR
Echemus angustifrons (Westring, 1861)	Seyyar & Demir, 2018	MER
Echemus levyi Kovblyuk & Seyyar, 2009 *	Seyyar & Demir, 2018	MER
Gnaphosa bicolor (Hahn, 1833)	Seyyar & Demir, 2018	EAR, SAR
Gnaphosa bithynica Kulczyński, 1903	Seyyar & Demir, 2018	MR, CAR
Gnaphosa corticola Simon, 1914	Seyyar & Demir, 2018	CAR
Gnaphosa dolosa Herman, 1879	Seyyar & Demir, 2018	MR
Gnaphosa lapponum (L. Koch, 1866)	Seyyar & Demir, 2018	EAR
Gnaphosa leporina (L. Koch, 1866)	Seyyar & Demir, 2018	EAR
Gnaphosa lucifuga (Walckenaer, 1802)	Seyyar & Demir, 2018	MR, CAR, EAR, SAR
Gnaphosa lucifuga minor Nosek, 1905 *	Seyyar & Demir, 2018	CAR
Gnaphosa lugubris (C.L. Koch, 1839)	Seyyar & Demir, 2018	EAR, SAR, AR
Gnaphosa microps Holm, 1939	Seyyar & Demir, 2018	MR
Gnaphosa modestior Kulczyński, 1897	Seyyar & Demir, 2018	EAR
Gnaphosa mongolica Simon, 1895	Seyyar & Demir, 2018	CAR
Gnaphosa montana (L. Koch, 1866)	Seyyar & Demir, 2018	CAR
Gnaphosa muscorum (L. Koch, 1866)	Seyyar & Demir, 2018	CAR
Gnaphosa opaca Herman, 1879	Seyyar & Demir, 2018	CAR
Gnaphosa petrobia L.Koch, 1872	Seyyar & Demir, 2018	CAR, EAR
Gnaphosa steppica Ovtsharenko, Platnick & Song, 1992	Seyyar & Demir, 2018	CAR
Gnaphosa tigrina Simon, 1878	Seyyar & Demir, 2018	EAR
Haplodrassus dalmatensis (C.L. Koch, 1866)	Seyyar & Demir, 2018	CAR, EAR
Haplodrassus invalidus (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	MER, CAR
Haplodrassus kulczynskii Lohmander, 1942	Seyyar & Demir, 2018	MER
Haplodrassus macellinus (Thorell, 1871)	Seyyar & Demir, 2018	CAR

Haplodrassus mediterraneus Levy, 2004	Seyyar & Demir, 2018	MER
Haplodrassus minor (O. Pickard-Cambridge, 1879)	Seyyar & Demir, 2018	CAR
Haplodrassus morosus (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	MER, CAR
***Haplodrassus orientalis* (L. Koch, 1866)**	**Seyyar *et al.*, 2022a**	**WBR**
Haplodrassus ovtchinnikovi Ponomarev, 2008	Seyyar & Demir, 2018	MER
Haplodrassus ponomarevi Kovblyuk & Seyyar, 2009	Seyyar & Demir, 2018	MER
Haplodrassus signifer (C.L. Koch, 1839)	Seyyar & Demir, 2018	MR, CAR, EAR,SAR, AR
Haplodrassus silvestris (Blackwall, 1833)	Seyyar & Demir, 2018	SAR
Haplodrassus soerenseni (Strand, 1900)	Seyyar & Demir, 2018	MER
Haplodrassus umbratilis (L. Koch, 1866)	Seyyar & Demir, 2018	CAR
***Kishidaia conspicua* (L. Koch, 1866)**	**Seyyar *et al.*, 2019a**	**CAR**
***Lasophorus zografae* Chatzaki, 2018**	**Seyyar *et al.*, 2019b**	**MER**
Leptodrassus albidus Simon, 1914	Seyyar & Demir, 2018	AR, MBR
***Marinarozelotes adriaticus* (Caporiacco, 1951)**	**Seyyar *et al.*, 2022b**	**EAR**
Marinarozelotes barbatus (L. Koch, 1866)	Seyyar & Demir, 2018	CAR
Marinarozelotes fuscipes (L. Koch, 1866)	Seyyar & Demir, 2018	SAR
Marinarozelotes glossus (Strand, 1915)	Seyyar & Demir, 2018	
Marinarozelotes lyonneti (Audouin, 1825)	Seyyar & Demir, 2018	MER, CAR
Marinarozelotes malkini Platnick & Murphy, 1984	Seyyar & Demir, 2018	CAR
***Marjanus platnicki* (Zhang, Song & Zhu, 2001)**	**Seyyar *et al.*, 2019c**	**CAR, AR**
Micaria albovittata (Lucas, 1846)	Seyyar & Demir, 2018	CAR, EAR, SAR
Micaria bosmansi Kovblyuk & Nadolny, 2008	Seyyar & Demir, 2018	CAR
Micaria coarctata (Lucas, 1846)	Seyyar & Demir, 2018	MR, EAR
Micaria dives (Lucas, 1846)	Seyyar & Demir, 2018	EAR
Micaria formicaria (Sundevall, 1831)	Seyyar & Demir, 2018	MER
***Micaria fulgens* (Walckenaer, 1802)**	**Çoşar & Danışman, 2021**	**MER**
Micaria pallipes (Lucas, 1846)	Seyyar & Demir, 2018	SAR
Micaria pulicaria (Sundevall, 1831)	Seyyar & Demir, 2018	EAR, SAR
Micaria rossica Thorell, 1875	Seyyar & Demir, 2018	CAR, EAR, SAR
Micaria sociabilis (Kulczyński, 1897)	Seyyar & Demir, 2018	CAR, MER
Nomisia aussereri (L. Koch, 1872)	Seyyar & Demir, 2018	MR, AR, CAR
Nomisia conigera (Spassky, 1941)	Seyyar & Demir, 2018	CAR, MER
Nomisia excerpta (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	AR
Nomisia exornata (C.L. Koch, 1839)	Seyyar & Demir, 2018	AR, CAR
Nomisia negebensis Levy, 1995	Seyyar & Demir, 2018	CAR, MER
Nomisia orientalis Dalmas, 1921 *	Seyyar & Demir, 2018	MER,
Nomisia palaestina (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	CAR
Nomisia ripariensis (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	MER, CAR
Parasyrisca turkenica Ovtsharenko, Platnick & Marusik, 1995 *	Seyyar & Demir, 2018	EAR
Parasyrisca vinosa (Simon, 1878)	Seyyar & Demir, 2018	SAR
Phaeocedus braccatus (L. Koch, 1866)	Seyyar & Demir, 2018	CAR
Poecilochroa senilis (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	CAR
Poecilochroa variana (C.L. Koch, 1839)	Seyyar & Demir, 2018	EAR
Pseudodrassus ricasolii Caporiacco, 1935 *	Seyyar & Demir, 2018	CAR
Pterotricha conspersa (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	MER
Pterotricha kochi (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	CAR
Pterotricha lentiginosa (C.L. Koch, 1837)	Seyyar & Demir, 2018	MER, CAR, EAR
Pterotricha lesserti Dalmas, 1921	Seyyar & Demir, 2018	CAR
***Pterotricha pseudoparasyriaca* Nuruyeva & Huseynov, 2016**	**Akpınar & Ceyhan, 2020**	**SAR**
Scotophaeus blackwalli (Thorell, 1871)	Seyyar & Demir, 2018	CAR
Scotophaeus quadripunctatus (Linnaeus, 1758)	Seyyar & Demir, 2018	AR
Scotophaeus scutulatus (L. Koch, 1866)	Seyyar & Demir, 2018	CAR
Setaphis carmeli (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	MER
Setaphis fuscipes (Simon, 1885)	Seyyar & Demir, 2018	MER
Setaphis gomerae (Schmidt, 1981)	Seyyar & Demir, 2018	MER, SAR
Setaphis parvula (Lucas, 1846)	Seyyar & Demir, 2018	AR
Sosticus loricatus (L. Koch, 1866)	Seyyar & Demir, 2018	MER

Synaphosus palearcticus Ovtsharenko, Levy & Platnick, 1994	Seyyar & Demir, 2018	CAR, EAR
***Synaphosus shirin* Ovtsharenko, Levy & Platnick, 1994**	**Danışman *et al.*, 2020**	**SAR**
***Synaphosus trichopus* (Roewer, 1928)**	**Danışman *et al.*, 2020**	**AR**
Trachyzelotes pedestris (C.L. Koch, 1837)	Seyyar & Demir, 2018	CAR
Turkozelotes microb Kovblyuk & Seyyar, 2009	Seyyar & Demir, 2018	MER
Urozelotes rusticus (L. Koch, 1872)	Seyyar & Demir, 2018	CAR
Zelotes aeneus (Simon, 1878)	Seyyar & Demir, 2018	CAR
Zelotes apricorum (L. Koch, 1876)	Seyyar & Demir, 2018	CAR
Zelotes atrocaeruleus (Simon, 1878)	Seyyar & Demir, 2018	CAR
Zelotes aurantiacus Miller, 1967	Seyyar & Demir, 2018	EAR
***Zelotes babunaensis* (Drensky, 1929)**	**Çoşar & Danışman, 2019**	**AR**
***Zelotes balcanicus* Deltshev, 2006**	**Çoşar & Danışman, 2020**	**CAR, MER, SAR, MBR**
Zelotes boluensis Wunderlich, 2011 *	Seyyar & Demir, 2018	WBR
Zelotes cingarus (O. Pickard-Cambridge, 1874)	Seyyar & Demir, 2018	CAR
Zelotes clivicola (L. Koch, 1870)	Seyyar & Demir, 2018	EAR
Zelotes daidalus Chatzaki, 2003	Seyyar & Demir, 2018	MER, SAR
Zelotes electus (C.L. Koch, 1839)	Seyyar & Demir, 2018	CAR, EAR, SAR
Zelotes erebeus (Thorell, 1871)	Seyyar & Demir, 2018	AR
Zelotes exiguus (Müller & Schenkel, 1895)	Seyyar & Demir, 2018	AR
Zelotes fulvaster (Simon, 1878)	Seyyar & Demir, 2018; **Seyyar & Demir, 2020a**	SAR , **EAR**
Zelotes harmeron Levy, 2009	Seyyar & Demir, 2018	MER
Zelotes hermani (Chyzer, 1897)	Seyyar & Demir, 2018	SAR
Zelotes latreillei (Simon, 1878)	Seyyar & Demir, 2018	EAR, SAR
***Zelotes laetus* (O. Pickard-Cambridge, 1872)**	**Danışman & Erol, 2022**	**MER**
Zelotes longipes (L. Koch, 1866)	Seyyar & Demir, 2018	MER, CAR, EAR
Zelotes metellus Roewer, 1928	Seyyar & Demir, 2018	MER
Zelotes oblongus (C.L. Koch, 1833)	Seyyar & Demir, 2018	EAR
Zelotes olympi (Kulczyński, 1903)	Seyyar & Demir, 2018	MR
Zelotes petrensis (C.L. Koch, 1839)	Seyyar & Demir, 2018	EAR
Zelotes prishutovae Ponomarev & Tsvetkov, 2006	Seyyar & Demir, 2018	MER
Zelotes puritanus Chamberlin, 1922	Seyyar & Demir, 2018	CAR
Zelotes scrutatus (O. Pickard-Cambridge, 1872)	Seyyar & Demir, 2018	AR
Zelotes segrex (Simon, 1878)	Seyyar & Demir, 2018	MR, MER
Zelotes similis (Kulczyński, 1887)	Seyyar & Demir, 2018	EAR
Zelotes strandi (Nosek, 1905)	Seyyar & Demir, 2018	MR
Zelotes subterraneus (C.L. Koch, 1833)	Seyyar & Demir, 2018	CAR
Zelotes talpinus (L. Koch, 1872)	Seyyar & Demir, 2018	CAR
Zelotes tenuis (L. Koch, 1866)	Seyyar & Demir, 2018	MER
Zelotes turcicus Seyyar, Demir & Aktaş, 2010 *	Seyyar & Demir, 2018	MER
Zelotes wunderlichi Blick, 2017 *	Seyyar & Demir, 2018	EBR

* = endemic species, recorded only from Türkiye.

In this study: 14 species and 3 genera were added to the last checklist; 13 species are endemic for Türkiye " * in Table (1) ".

According to the World Spider Catalog (2022), *Cryptodrassus helvolus* (O. Pickard-Cambridge, 1872) is known from Russia (Europe), Türkiye, Cyprus, Israel, Iran, Kazakhstan in the world. It is also included in the online spider list of Türkiye (Danışman *et al.*, 2022), but we could not find any literature on locality records in Anatolia therefore it is removed from the list. *Zelotes longestylus* Simon, 1914 = *Setaphis fuscipes* (Simon, 1885) in this list.

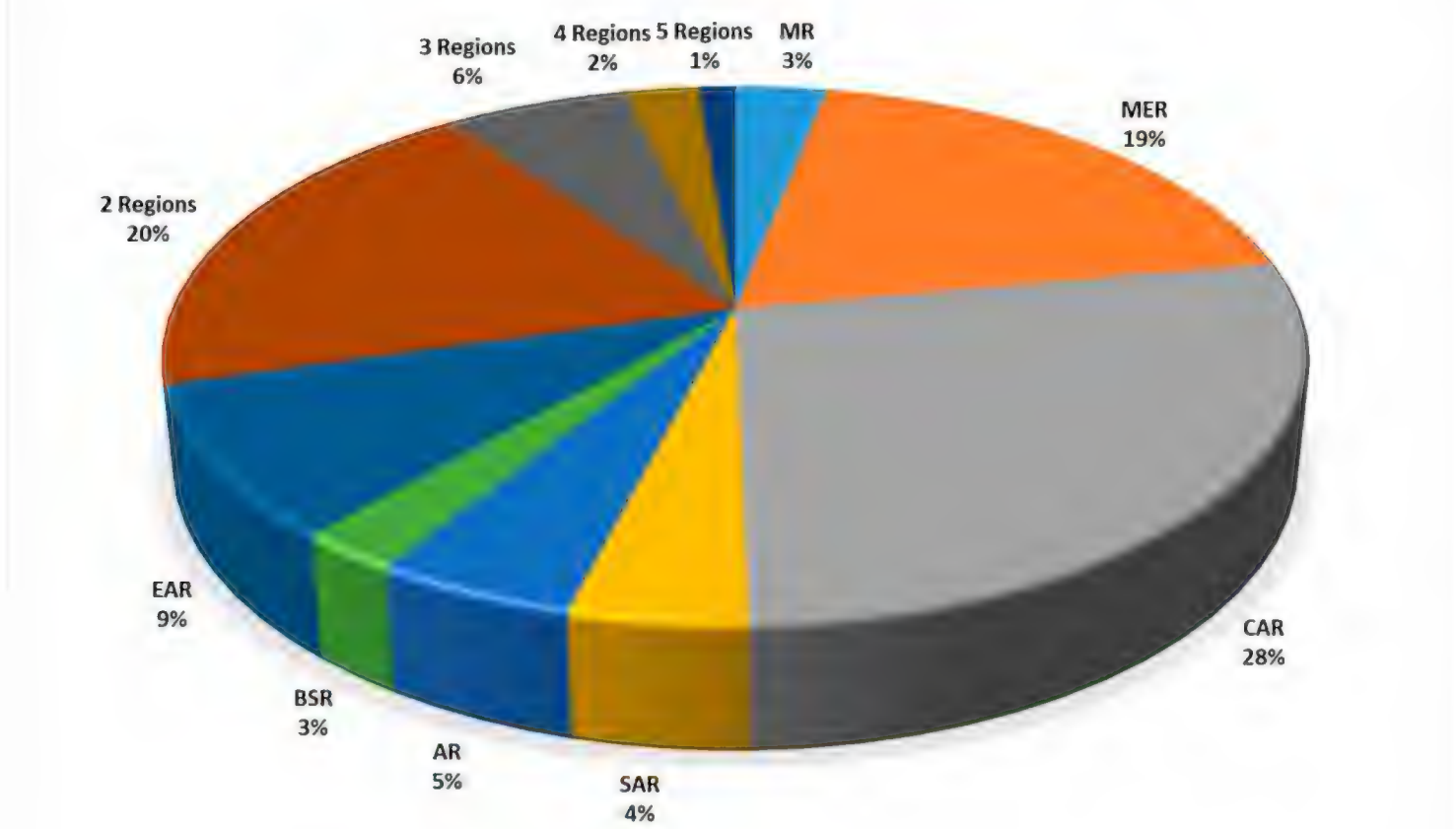

Fig. 2. Distributions (percent) of Turkish ground spiders into seven regions of Türkiye.

Türkiye is geographically divided into seven regions: Marmara, Aegean, Black Sea, Central Anatolia, Eastern Anatolia, Southeastern Anatolia, and the Mediterranean. Ground spiders occur almost in all regions of Türkiye, inhabiting lowlands, forests, and mountains. According to their current distribution, the Turkish ground spiders are listed in seven regions in Türkiye by published papers on Turkish spiders fauna.

The density of presence of gnaphosid species in the seven geographic regions of Türkiye is different according to regions and species (Tables 2-6 & Fig. 2).

Table 2. List of ground spiders recorded from only one region of Türkiye.

MR	*Anagraphis ochraeca*, *Gnaphosa dolosa*, *Gnaphosa microps*, *Zelotes olympi*, *Zelotes strandi*
MER	*Aphantaulax cincta*, *Berinda Cooki*, *Cesonia aspida*, *Drassodes cupreus*, *Drassodes serratichelis*, *Drassodex hypocrita*, *Drassyllus crimeaensis*, *Drassyllus jubatopalpis*, *Drassyllus sur*, *Echemus angustifrons*, *Echemus levyi*, *Haplodrassus kulczynskii*, *Haplodrassus mediterraneus*, *Haplodrassus ovtchinnikovi*, *Haplodrassus ponomarevi*, *Haplodrassus soerenseni*, *Lasophorus zografae*, *Micaria formicaria*, *Micaria fulgens*, *Nomisia orientalis*, *Pterotricha conspersa*, *Setaphis carmeli*, *Setaphis fuscipes*, *Sosticus loricatus*, *Turkozelotes microb*, *Zelotes harmeron*, *Zelotes laetus*, *Zelotes metellus*, *Zelotes prishutovae*, *Zelotes tenuis*, *Zelotes turcicus*
CAR	*Aphantaulax trifasciata trimaculata*, *Berinda amabilis*, *Berinda hakani*, *Berlandina nabozhenkoi*, *Berlandina plumalis*, *Berlandina pulchra*, *Callilepis cretica*, *Callilepis nocturna*, *Callilepis schuszteri*, *Civizelotes solstitialis*, *Drassodes difficilis*, *Drassodes similis*, *Drassyllus dadia*, *Drassyllus vinealis*, *Gnaphosa corticola*, *Gnaphosa lucifuga minor*, *Gnaphosa mongolica*, *Gnaphosa montana*, *Gnaphosa muscorum*, *Gnaphosa opaca*, *Gnaphosa steppica*, *Haplodrassus macellinus*, *Haplodrassus minor*, *Haplodrassus umbratilis*, ***Kishidaia conspicua***, *Marinarozelotes barbatus*, *Marinarozelotes malkini*, *Micaria bosmansi*, *Nomisia palaestina*, *Phaeocedus braccatus*, *Poecilochroa senilis*, *Pseudodrassus ricasolii*, *Pterotricha kochi*, *Pterotricha lesserti*, *Scotophaeus blackwalli*, *Scotophaeus scutulatus*, *Trachyzelotes pedestris*, *Urozelotes rusticus*, *Zelotes aeneus*, *Zelotes apricorum*, *Zelotes atrocaeruleus*, *Zelotes cingarus*, *Zelotes puritanus*, *Zelotes subterraneus*, *Zelotes talpinus*
SAR	*Haplodrassus silvestris*, *Marinarozelotes fuscipes*, *Micaria pallipes*, *Parasyrisca vinosa*, *Pterotricha pseudoparasyriaca*, *Synaphosus shirin*, *Zelotes hermani*
AR	*Nomisia excerpta*, *Scotophaeus quadripunctatus*, *Setaphis parvula*, *Synaphosus trichopus*, *Zelotes babunaensis*, *Zelotes erebeus*, *Zelotes exiguus*, *Zelotes scrutatus*
BSR	*Haplodrassus orientalis*, *Marinarozelotes glossus*, *Zelotes boluensis*, *Zelotes wunderlichi*
EAR	*Civizelotes gracilis*, *Drassyllus villicus*, *Gnaphosa lapponum*, *Gnaphosa leporina*, *Gnaphosa modestior*, *Gnaphosa tigrina*, *Marinarozelotes adriaticus*, *Micaria dives*, *Parasyrisca turkenica*, *Poecilochroa variana*, *Zelotes aurantiacus*, *Zelotes clivicola*, *Zelotes oblongus*, *Zelotes petrensis*, *Zelotes similis*

Table 3. List of ground spiders recorded from two regions of Türkiye.

MER-CAR	*Anagraphis pallens*, *Drassodes bifidus*, *Drassodes lacertosus*, *Haplodrassus invalidus*, *Haplodrassus morosus*, *Marinarozelotes lyonneti*, *Nomisia ripariensis*, *Micaria sociabilis*, *Nomisia conigera*, *Nomisia negebensis*
CAR-AR	*Aphantaulax trifasciata*, *Drassyllus pusillus*, *Drassodes caspius*, *Nomisia exornata*, *Marjanus platnicki*
MER-BSR	*Cryptodrassus creticus*
CAR-EAR	*Drassodes villosus*, *Drassyllus pumilus*, *Gnaphosa petrobia*, *Haplodrassus dalmatensis*, *Synaphosus palearcticus*
EAR-SAR	*Drassyllus lutetianus*, *Gnaphosa bicolor*, *Micaria pulicaria*, *Zelotes latreillei*, *Zelotes fulvaster*
MR-CAR	*Gnaphosa bithynica*
AR-BSR	*Leptodrassus albidus*
MR-EAR	*Micaria coarctata*
MER-SAR	*Setaphis gomerae*, *Zelotes daidalus*
MR-MER	*Zelotes segrex*

Table 4. List of ground spiders recorded from three regions of Türkiye.

AR, MER, CAR	*Berinda ensigera*
CAR, EAR, SAR	*Civizelotes caucasius*, *Drassyllus praeficus*, *Micaria albovittata*, *Micaria rossica*, *Zelotes electus*
EAR, SAR, AR	*Gnaphosa lugubris*
MR, AR, CAR	*Nomisia aussereri*
MER, CAR, EAR	*Pterotricha lentiginosa*, *Zelotes longipes*

Table 5. List of ground spiders recorded from four regions of Türkiye.

MER, CAR, EAR, SAR	*Drassodes lutescens*, *Drassodes pubescens*
MR, CAR, EAR, SAR	*Gnaphosa lucifuga*
CAR, MER, SAR, MBR	*Zelotes balcanicus*

Table 6. List of ground spiders recorded from five regions of Türkiye.

MR, MER, CAR, EAR, SAR	*Drassodes lapidosus*
MR, CAR, EAR, SAR, AR	*Haplodrassus signifer*

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Taxonomic structure and biotopic distribution of the arachnids in biocenoses environs of Agzybir Estuary of the Caspian Sea

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Abstract

The study of the species composition and biotopic distribution of arachnids in the vicinity of the Akzybir estuary (including natural biocenoses and agrocenoses) was carried out in order to establish the most widespread species and the prospects for their use as regulators of the number of harmful insects in agrocenoses. A total of 57 species of arachnids belonging to 4 orders, 15 families, and 44 genera were identified: 37 species of them were noted only in natural habitats, 19 species, both in natural habitats and in agrocenoses, and 3 species, only in agrocenoses. Arachnids identified in agrocenoses accounted for about 35% of the total number of detected species. The largest number of recorded species belonged to the order Araneae: families Gnaphosidae, Lycosidae, Linyphiidae, Thomisidae, and Salticidae. Presumably, representatives of the order Araneae: families Agelenidae, Araneidae, Lycosidae, Theridiidae, Thomisidae can be promising for use as regulators of the number of harmful insects in the agrocenoses of the coastal territory of the Akzybir Estuary, subject to strictly regulated and selective use of pesticides.

Keywords: Arachnida, fauna, distribution, coastal biocenoses, agrocenoses.

Introduction

Arachnida, as active predators, are important components of the arthropod community in natural habitats and agrocenoses. According to modern systematics, the class includes 11 orders. Representatives of the two orders Solifugae and Araneae, as general consumers, are especially actively involved in the process of regulating the

abundance of invertebrates in biocenoses, exterminating a huge number of insects and thereby limiting the abundance of many harmful species (Nyffeler, 1999; Ghavami, 2006; Ghavami *et al.*, 2007; Kharchenko, 2011; Hogg & Kent, 2011). This makes it promising to use them as a biological method of controlling plant pests in agro-industrial complexes. Solifuges and most species of spiders are polyphages, feeding on various representatives of the insect class. Many works have been published on entomophagous insects that exterminate pests of fodder crops in Azerbaijan (Akhmedov, 1983; Beybutov & Kamarli, 1983; Mammadov, 2004; Mammadov & Alieva, 2010). Information on such important groups of obligate predators as solifuges and spiders in the agrocenoses of the republic is rare (Legotay, 1971; Aliev & Gadzhiev, 1983; Dunin & Mammadov, 1992). Material on the fauna of spider populations of natural biocenoses in the eastern part of Azerbaijan are concentrated in several works (Dunin, 1984; 1988a; 1988b; Huseynov, 1999; Nuruyeva & Huseynov, 2011; Huseynov & Khasayeva, 2013). However, data about the fauna and the structure of their populations in the vicinity and on the coastal territory of the Akzybir estuary, large areas of which are occupied by agrocenoses, is not available in the literature. The development of faunistic studies of arachnids in areas including agrocenoses is one of the priority areas for studying the biodiversity of the arthropod fauna of Eastern Transcaucasia.

The purpose of this study is to identify the species composition and biotopic distribution of arachnids in the indicated territory, to establish the most common species for further study of the prospects for their use in agrocenoses. The work was carried out in the general volume of planned research on the topic "Peculiarities of the formation of the structure of communities of terrestrial arthropods in natural biocenoses and agrocenoses of the foothill part of the southeastern slopes of the Greater Caucasus" conducted from 2012 to 2020.

Material and Methods

The Akzybir estuary is located 120 km from Baku on the western coast of the Caspian Sea, separated from it by a narrow coastal strip (Fig. 1). It was formed from the bay of the Caspian Sea due to a significant decrease in its level. Part of the bay, having become shallow and, having lost contact with the Caspian, but at the same time receiving a large amount of fresh water from alternative water sources, desalinated and began to exist quite autonomously in the mode of a freshwater reservoir (Rychagov, 1997). The length of the estuary, depending on the water level, ranges from 20-25 km, the maximum width is 3.5-4 km, the length of the coastline is 37.5 km, and the area is 3600 ha. Coastal and near-water vegetation of the estuary is represented by more than 70 plant species. The coastal zone of the western and northwestern parts of the estuary is occupied by coastal-meadow and tree-shrub vegetation. Here, sedge, cereal, and forb associations predominate (Abdullaev *et al.*, 2014). Currently, in the semi-desert and dry-steppe landscapes of the northwestern part of the estuary, large areas are occupied by agrocenoses occupied by vineyards, cereals, legumes, melons, vegetables and horticultural crops.

The studies were carried out in July 2018 on routes in the vicinity of the Akzybir estuary. The coastal part of the estuary and a strip of land up to 5-6 km wide with the capture of areas occupied by agrocenoses were examined. The collection of arachnids was carried out by examining shelters (stones, burrows), plants and the soil surface. Methods generally accepted in arachnology (mowing with an entomological net, manual collecting, setting Barber soil traps) were used (Fasulati, 1971). A total of 414 specimens of arachnids: 9 scorpions, 17 solifuges, 10 harvestmen (Opiliones) and 378 spiders were

noted. To determine the species of spiders, literary and online determinants were used (Azheganova, 1968; Dunin & Mammadov, 1968; Tyshchenko, 1971; Seifullina & Kartsev, 2011). The degree of similarity between the arachnidofauna of natural and altered biotopes was assessed using the Jaccard coefficient (Schmidt, 1980) calculated by the formula: $J = C/A + B - C$, where C: the number of species common to natural biocenoses and agrocenoses, A: the number of species in natural biocenoses, B: the number of species in agrocenoses.

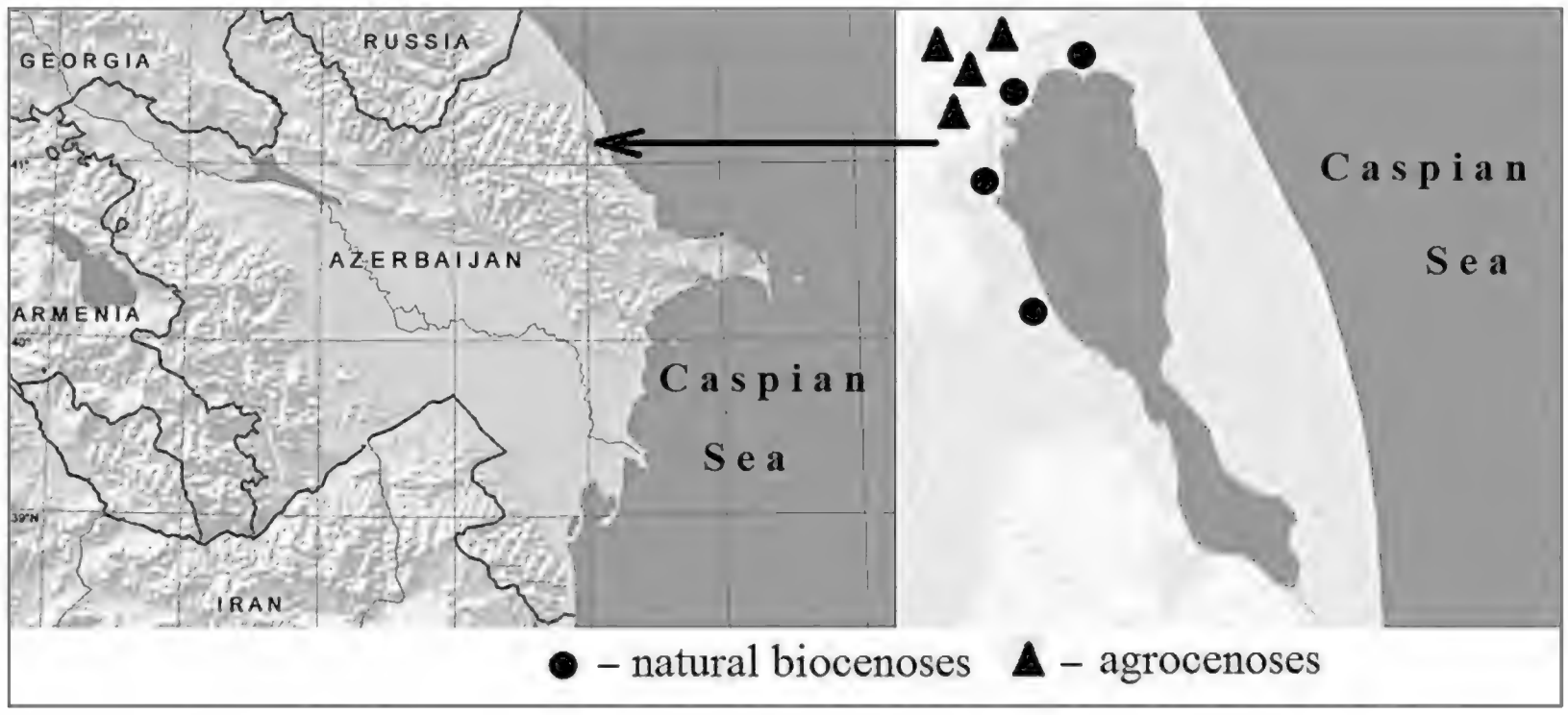

Fig. 1. Akzybir estuary on the map of Azerbaijan indicating the places of material collecting.

Results and Discussion

When examining natural biocenoses and agrocenoses in the vicinity of the Akzybir estuary, 57 species of arachnids were found: one species of Scorpiones, one species of Solifugae, two species of Opiliones (harvestmen) and 53 species of spiders belonging to 15 families and 44 genera (Table 1): 37 species of these were recorded only in natural biocenoses, 19 species, both in natural biocenoses and in agrocenoses, and 3 species only in agrocenoses. Consequently, 20 species of arachnids in the agrocenoses: 18 species of spiders, one species of Solifugae and one species of Opiliones (harvestmen) were noted. The largest number of all found species of spiders was represented by families Araneidae, Lycosidae, and Linyphiidae (8 species each), Gnaphosidae and Theridiidae (6 species each), Agelenidae and Thomisidae (4 species each). The remaining 5 families were represented by 1-2 species.

In natural biocenoses, a total of 288 specimens of arachnids, in agrocenoses – 126 specimens were noted. The families Gnaphosidae, Lycosidae, Theridiidae (9.37–22.56%) dominated in natural biocenoses from 15 families in terms of the number of specimens. The families Araneidae, Lycosidae, and Theridiidae quantitatively dominated in the agrocenoses (19.84–23.02%) (Table 2).

The biotopic distribution of spiders was directly related to the layering of phytocenoses (vertical division of plant communities by height in the spatial structure of the biocenosis) characteristic of representatives of different families (Prisniy, 1993). Spiders were noted in all tiers of the studied biotopes, but their saturation with species was different. The largest number of species was represented by chortobionts (21 species) and herpetobionts (19 species) (Table 3).

Table 1. Taxonomic list of arachnids recorded in the vicinity of the Akzybir estuary.

Order / family / genus / species
Order **Scorpiones**
Family **Buthidae**
Mesobuthus Vachon, 1950
Mesobuthus eupeus (C.L. Koch, 1839)*
Order **Solifugae**
Family **Galeodidae**
Galeodes Olivier, 1791
Galeodes araneoides (Pallas, 1772)**
Order **Opiliones**
Family **Phalangiidae**
Phalangium Linnaeus, 1758
Phalangium opilio Linnaeus, 1758*
Phalangium punctipes (Koch, 1879) ***
Order **Araneae**
Family **Agelenidae**
Agelena Walckenaer, 1805
Agelena labyrinthica (Clerck, 1757) **
Agelena sp. *
Tegenaria Latreille, 1804
Tegenaria domestica (Clerck, 1757) ***
Tegenaria sp. *
Family **Araneidae**
Agalenatea Archer, 1951
Agalenatea redii (Scopoli, 1763) **
Araneus Clerck, 1757
Araneus angulatus Clerck, 1757 **
Araneus diadematus Clerck, 1757 **
Argiope Savigny, 1825
Argiope lobata (Pallas, 1772) **
Cercidia Thorell, 1869
Cercidia prominens (Westring, 1851) *
Mangora O. Pickard-Cambridge, 1889
Mangora acalypha (Walckenaer, 1802) **
Neoscona Simon, 1864
Neoscona adianta (Walckenaer, 1802) *
Nuctenea Simon, 1864
Nuctenea umbratica (Clerck, 1757) **
Family **Dictynidae**
Argyroneta Latreille, 1804
Argyroneta aquatica (Clerck, 1757) *
Family **Gnaphosidae**
Drassodes Westring, 1851
Drassodes lapidosus (Walckenaer, 1802) *
Drassyllus Chamberlin, 1922
Drassyllus praeficus (L. Koch, 1866) *
Gnaphosa Latreille, 1804
Gnaphosa lugubris (C.L. Koch, 1839) *
Nomisia Dalmas, 1921
Nomisia exornata (C.L. Koch, 1839) *
Zelotes Gistel, 1848
Zelotes petrensis (C.L. Koch, 1839) *
Zelotes sp. *
Family **Linyphiidae**
Agyneta Hull, 1911
Agyneta fuscipalpa (C.L. Koch, 1836) *
Agyneta rurestris (C.L. Koch, 1836) *
Linyphia Latreille, 1804
Linyphia tenuipalpis Simon, 1884 *
Microlinyphia Gerhardt, 1928
Microlinyphia pusilla (Sundevall, 1830) *
Microneta Menge, 1869
Microneta viaria (Blackwall, 1841) *
Tenuiphantes Saaristo, Tanasevitch, 1996
Tenuiphantes mengei (Kulczynski, 1887) *
Tenuiphantes tenuis (Blackwall, 1852) *
Walckenaeria Blackwall, 1833
Walckenaeria nudipalpis (Westering, 1851) *
Family **Lycosidae**
Alopecosa Simon, 1885
Alopecosa aculeata (Clerck, 1757) **
Alopecosa striatipes (C.L. Koch, 1839) **
Arctosa C.L. Koch, 1847
Arctosa leopardus (Sundevall, 1833) *
Lycosa Latreille, 1804
Lycosa singoriensis (Laxmann, 1770) *
Pardosa C.L. Koch, 1847
Pardosa luctinosa Simon, 1876 **
Pardosa sp. *
Trochosa C.L. Koch, 1847
Trochosa ruricola (De Geer, 1778) **
Trochosa sp. *
Family **Miturgidae**
Zora C.L. Koch, 1847
Zora nemoralis (Blackwall, 1861) *
Zora sp. *
Family **Pholcidae**
Pholcus Walckenaer, 1805
Pholcus phalangioides (Fuesslin, 1775) *
Pholcus sp. *
Family **Pisauridae**
Pisaura Simon, 1886
Pisaura mirabilis (Clerck, 1757) *
Dolomedes Latreille, 1804
Dolomedes sp. *
Family **Salticidae**
Chalcoscirtus Bertkau, 1880
Chalcoscirtus infimus (Simon, 1868) *
Pseudeuophrys Dahl, 1912
Pseudeuophrys obsoleta (Simon, 1868) *
Family **Theridiidae**
Episinus Walckenaer, 1809
Episinus truncates Latreille, 1809 *
Latrodectus Walckenaer, 1805
Latrodectus tredecimguttatus (Rossi, 1790) ***
Parasteatoda Archer, 1946
Parasteatoda lunata (Clerck, 1757) *
Steatoda Sundevall, 1833
Steatoda paykulliana (Walckenaer, 1806) **
Steatoda triangulosa (Walckenaer, 1802) **
Theridion Walckenaer, 1805
Theridion cinereum Thorell, 1875 **
Family **Thomisidae**
Bassaniodes Pocock, 1903
Bassaniodes tristrami (O. Pickard-Cambridge, 1872) *
Thomisus Walckenaer, 1805
Thomisus onustus Walckenaer, 1805 **
Xysticus C.L. Koch, 1835
Xysticus cristatus (Clerck, 1757) *
Xysticus kochi Thorell, 1872 **

Note: (*) - species noted exclusively in natural biocenoses; (**) - species noted both in natural biocenoses and in agrocenoses; (***) – species noted only in agrocenoses.

Table 2. The number of individuals and the degree of similarity of the representation of arachnidofauna in natural biocenoses and agrocenoses (Jaccard coefficient in %).

Family	Number				*J*
	Natural biocenoses		Agrocenoses		
	specimens	%	specimens	%	
Buthidae	9	3.12	-	-	-
Galeodidae	10	3.47	7	5.56	0.217
Phalangiidae	6	2.09	4	3.17	0.193
Agelenidae	13	4.51	15	11.90	0.447
Araneidae	24	8.34	25	19.84	0.396
Dictynidae	10	3.48	-	-	-
Gnaphosidae	65	22.56	-	-	-
Linyphiidae	18	6.25	-	-	-
Lycosidae	32	11.12	28	22.23	0.321
Miturgidae	14	4.86	-	-	-
Pholcidae	8	2.78	-	-	-
Pisauridae	12	4.16	-	-	-
Salticidae	17	5.91	-	-	-
Theridiidae	27	9.37	29	23.02	0.409
Thomisidae	23	7.98	18	14.28	0.269
Total	288	100	126	100	-

Most spiders, as is known, although they constitute a single trophic group in terms of nutrition, differ in the features of the strategy and tactics of hunting behaviour, which makes it possible to classify them into cobweb catchers, hunters, and ambushers (Prisniy, 1993). Some species (for example, representatives of the genus *Lycosa*) combine different methods of hunting, using, for example, ambush tactics – during the daytime, and search and hunting – exclusively in the evening-night hours.

Table 3. Ecological and taxonomic characteristics of spider community in natural biocenoses and agrocenoses of the environs of the Akzybir estuary.

Family	Hunting method	Tiered distribution					
		Number of species					
		I	II	III	IV	V	Total
Agelenidae	cobweb catchers	-	1	3	-	-	4
Araneidae	cobweb catchers	-	-	3	4	1	8
Dictynidae	hunters	1	-	-	-	-	1
Gnaphosidae	hunters	-	6	-	-	-	6
Linyphiidae	cobweb catchers	-	3	3	1	1	8
Lycosidae	hunters /ambushers	-	6	2	-	-	8
Miturgidae	hunters	-	1	1	-	-	2
Pholcidae	cobweb catchers	-	-	-	-	2	2
Pisauridae	hunters	1	-	1	-	-	2
Salticidae	ambushers	-	-	2	-	-	2
Theridiidae	cobweb catchers	-	1	4	1	-	6
Thomisidae	ambushers	-	1	2	1	-	4
Total		2	19	21	7	4	53

Note: I - shallow water; II - ground layer (herpetobium); III - grass layer (hortobium); IV - shrub layer (tamnobium); V - tree layer (dendrobium).

According to the literature data, the number of spider species in agrocenoses can vary widely (from 20 to 188) and is determined by a complex of different factors: the landscape and climatic conditions of the area, the size and surroundings of the fields, the cultivated crop, the practice of agricultural technology, the methods and duration of material collection (Legotay, 1971; Dunin & Mammadov, 1992; Lukashevich, 2006; Guseva, 2014). For example, representatives of family Gnaphosidae prefer xerophytic habitats and can serve as an indicator of high heat supply and dryness of the biotope (Prisniy, 1993). Spiders of family Lycosidae are much more demanding on the level of moisture, although they also include xerophiles. Family Linyphiidae are predominantly meso- and hygrophilous spiders. Web spiders (Araneidae) choose places with the presence of shrubs or herbaceous plants, with depressions or elevations in relief, and to a lesser extent with the amount of potential prey and microclimatic factors (Table 4). But, in all cases, in agrocenoses, in comparison with natural biocenoses, there is always a more or less pronounced decrease in the species richness of spiders (Nyffeler, 1984).

Table 4. Distribution of arachnid families in the main biotopes of the environs of the Akzybir estuary.

Family	Biotope								
	1	2	3	4	5	6	7	8	9
Buthidae	+	-	+	-	-	-	-	-	-
Galeodidae	+	-	+	-	-	-	-	+	-
Phalangiidae	+	-	+	-	-	-	-	+	-
Agelenidae	-	+	+	-	-	-	-	+	-
Araneidae	-	+	-	-	-	+	-	+	+
Dictynidae	-	-	-	+	-	-	+	-	-
Gnaphosidae	+	-	+	-	+	-	-	-	-
Linyphiidae	-	+	+	-	-	-	-	-	-
Lycosidae	+	-	+	-	+	-	-	+	-
Miturgidae	+	-	-	-	+	-	-	-	+
Pholcidae	-	-	-	-	-	-	-	-	+
Pisauridae	-	+	-	+	-	-	-	-	-
Salticidae	-	+	-	-	-	-	-	-	-
Theridiidae	+	-	+	-	-	-	-	+	-
Thomisidae	+	-	-	-	-	-	-	+	+

Note: 1. wormwood-saline semi-desert areas. 2. coastal strip with herbaceous, semi-shrub and rare woody vegetation. 3. stony semi-desert areas. 4. stretches of the estuary. 5. coastal rocks, stony placers. 6. sandy coastal slopes from the sea. 7. wetlands of the coast. 8. fields, garden plots. 9. residential and outbuildings within the coastal strip.

The communities of spiders in the biocenoses of the coastal strip of the estuary had the most complex spatial organization due to the diversity and density of the vegetation cover, which provides an abundance of invertebrates – potential preys of spiders. Agrocenoses have a simpler vertical structure, a less abundant supply of food objects, which apparently explains the decrease in the diversity of families and species of spiders. In addition, these biocenoses are often exposed to human impact, which naturally affects the species composition and abundance of invertebrates, including arachnids. The degree of similarity between the arachnidofauna of natural and altered biotopes (Jaccard coefficient) ranged from 0.193 to 0.447 (0.321 on average) (Fig. 2).

In total, 57 species of arachnids were recorded in the natural landscapes and agrocenoses of the studied environs of the Akzybir estuary, of which 66.7% of the species were recorded only in natural habitats, 29.8% of the species were recorded both

in natural areas and in agrocenoses, and 5.3% of species were recorded only in agrocenoses.

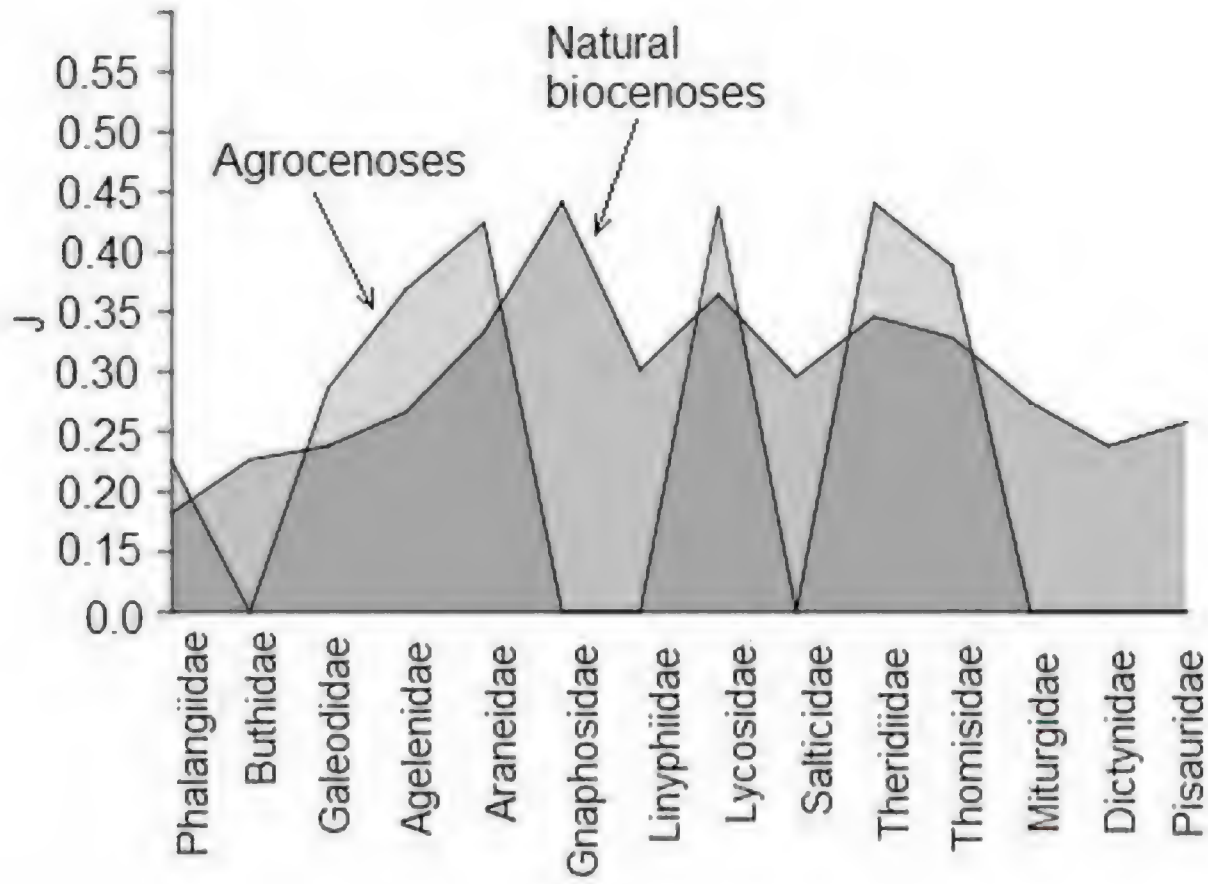

Fig. 2. The degree of similarity of the arachnidofauna of natural and modified biotopes in terms of abundance (Jaccard coefficient).

The specificity of the structure of arachnocomplexes in agrocenoses lies in their attractiveness mainly for spiders that are not specialized in choosing prey and species prone to euryphagy. These are mainly spiders building trapping nets (families Agelenidae, Theridiidae, Araneidae), as well as wandering hunters of the families Lycosidae and Gnaphosidae (Table 5).

Table 5. Occurrence of arachnids in various agrocenoses.

Family	Genus	Agrocenoses				
		I	II	III	IV	V
Galeodidae	*Galeodes*	+	-	+	+	-
Phalangiidae	*Phalangium*	+	-	-	+	-
Agelenidae	*Agelena*	+	+	-	-	-
	Tegenaria		+	-	-	+
Araneidae	*Agalenatea*	-	+	-	-	+
	Araneus	+	-	-	+	+
	Argiope	+	+	-	+	+
	Mangora	-	-	+	-	-
	Nuctenea	+	-	-	+	+
Lycosidae	*Alopecosa*	+	+	+	+	-
	Pardosa	+	-	+	-	-
	Trochosa	+	-	+	-	-
Theridiidae	*Latrodectus*	+	-	+	-	-
	Steatoda	+	+	+	+	-
	Theridion	-	+	+	-	-
Thomisidae	*Thomisus*	-	+	-	-	+
	Xysticus	+	-	+	+	-

Note: I – vineyard; II – cornfield; III – pumpkin plantation; IV – legume plantation; V – orchard.

In total, 18 species of spiders were noted in agrocenoses, which is about 35% of the total number of species found. Such a small diversity of the species composition of spiders in the agrocenoses of the studied region can be explained by two reasons: the relatively recent creation of agrocenoses (no more than 15 years); the active use of pesticides makes fields, gardens and gardens for growing fodder, fruit and vegetable crops less attractive for various types of spiders, because they reduce the food supply in the form of a variety of insects – pests, entomophages, pollinators, etc. and affects the number of predators themselves. When the soil is cultivated with chemical fertilizers, the use of pesticides, as well as irrigation reclamation, some of the spiders die, the other part migrates to the territories adjacent to the agrocenoses.

Conclusion

Studies of the arachnid fauna of the coastal territory (including agrocenoses) of the western and northwestern parts of the Akzybir estuary revealed 57 species: one species of scorpion, one species of solifugae, two species of harvestmen and 53 species of spiders belonging to 15 families and 44 genera, of which 18 species due to their mass character can be promising for agrocenoses. The families Gnaphosidae, Lycosidae, Linyphiidae, Thomisidae and Salticidae are characterized by the largest number of species. The vertical layering in the spatial structure of the biocenosis of representatives of the spider families noted in the vicinity of the estuary and their distribution in various natural and modified biotopes were determined. The coastal part of the lake has a slightly wider, but very similar structure of the araneocomplex to the agrocenoses.

Most agrocenoses have a simplified and uniform spatial structure in terms of vertical tiering, in contrast to natural biocenoses. In addition, they are subjected to human economic activity with varying frequency. In this regard, in agrocenoses the vegetative layer the fauna of cobweb catchers spiders are somewhat poorer presentation than natural biocenoses, but stray hunters (herpetobionts) are almost as abundant as on natural biocenoses.

Representatives of the families Agelenidae, Araneidae, Lycosidae, Theridiidae, and Thomisidae can presumably be promising for use as regulators of the number of harmful insects in the agrocenoses of the coastal territory of the estuary, provided that pesticides are strictly regulated and selectively used. It should be noted that the data obtained are the first results of the study of the araneofauna of this region, and therefore are of a preliminary nature and require clarification during further research.

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First record of the dwarf spider *Diplocephalus graecus* (O. Pickard-Cambridge, 1873) from Türkiye (Araneae: Linyphiidae)

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Abstract

Diplocephalus graecus (O. Pickard-Cambridge, 1873) is recorded from Türkiye for the first time. In addition, characteristic features and photographs of *D. graecus* are presented. With this data, the number of species belonging to family Linyphiidae in Türkiye has been raised to 155.

Keywords: Araneae, Linyphiidae, new record, Türkiye.

Introduction

In the Linyphiidae, 4730 species in 625 genera have been identified in the world (World Spider Catalog, 2022). Genus *Diplocephalus* Bertkau, 1883 includes 49 extant species, and one subspecies, with very diverse palpal morphology, mainly recorded from Europe (World Spider Catalog, 2022). In Türkiye, seven species are presently included in the genus *Diplocephalus*: *D. caucasicus* Tanasevitch, 1987, *D. crassilobus* (Simon, 1884), *D. cristatus* (Blackwall, 1833), *D. latifrons* (O. Pickard-Cambridge, 1863), *D. picinus* (Blackwall, 1841), *D. protuberiscus* Wunderlich, 2022, and *D. turcicus* Brignoli, 1972 (Topçu *et al.*, 2005; Seyyar *et al.*, 2009; Danışman *et al.*, 2022). Three male specimens of *Diplocephalus graecus* (O. Pickard-Cambridge, 1873) were found in Kahramanmaraş and Osmaniye provinces. Its presence represents the easternmost boundary of this species in Europe. This new record increases the known Turkish

linyphiid fauna to 155 species in 74 genera (Danışman *et al.*, 2022; Demir & Seyyar, 2017; Topçu *et al.*, 2005).

Material and Methods

The spider specimens were collected from Kahramanmaraş and Osmaniye provinces of Türkiye during the day by hand aspirator. Identification depended on the works of Bosmans (1996) and Dawson *et al.* (2011). Digital images were taken using a Canon EOS 250D camera attached to Leica S8APO microscope. Pictures were edited using "Combine ZM" and "Photoshop CC 2019" software. SEM microphotograph was made with JEOL JSM-5600 in the University of Kırıkkale. Specimens were deposited at Arachnological Museum of Kırıkkale University (KUAM). All measurements are taken in millimetres. Leg measurements are shown in this order (femur, patella, tibia, metatarsus, tarsus, total length).

Fig. 1. *Diplocephalus graecus* (O. Pickard-Cambridge, 1873) ♂. A-D. Habitus. A. dorsal view. B. ventral view. C. lateral view. D. frontal view. (Scale bar: 0.2 mm).

Results

Taxonomy

Diplocephalus Bertkau, 1883

Diplocephalus graecus (O. Pickard-Cambridge, 1873) (Figs. 1-3)

Material examined: 2♂♂, Kahramanmaraş Province, Andırın district, Akifiye neighbourhood (37°38'47.8"N, 36°20'49.6"E) (24.06.2022), from a meadow, (KUAM-LIN. Dip. gra.01). 1♂, Osmaniye Province, Kadirli district, Maksutoğlu plateau (37°39'06.9"N, 36°13'02.7"E) (25.06.2022), from a meadow, (KUAM-LIN. Dip. gra.02).

Male description

Prosoma brown, with small cephalic tubercle. Legs light yellowish brown. Opisthosoma is grey-black, with paler small spots dorsally (Figs. 1A, 1C). Sternum dark brown (Fig. 1B). Chelicerae yellowish brown (Fig. 1D). Male palpal tibia rounded, prolonged over the cymbium. Embolic division with two terminal teeth (Figs. 2-3). Total length 1.60. Prosoma 0.65 long, 0.55 wide. Opisthosoma 0.95 long, 0.65 wide. Ocular area 0.25 long. Sternum 0.40 long, 0.35 wide, Chelicerae 0.30 long, 0.15 wide. Leg formula IV, I, II, III.

Lengths of legs: Leg I. 0.75, 0.15, 0.65, 0.50, 0.45, 2.50; Leg II. 0.65, 0.15, 0.60, 0.50, 0.40, 2.30; Leg III. 0.55, 0.15, 0.40, 0.40, 0.35, 1.85; Leg IV. 0.75, 0.15, 0.75, 0.60, 0.45, 2.70.

Distribution: Europe, Madeira, North Africa and Israel (World Spider Catalog, 2022), and here cited for the first time from Türkiye.

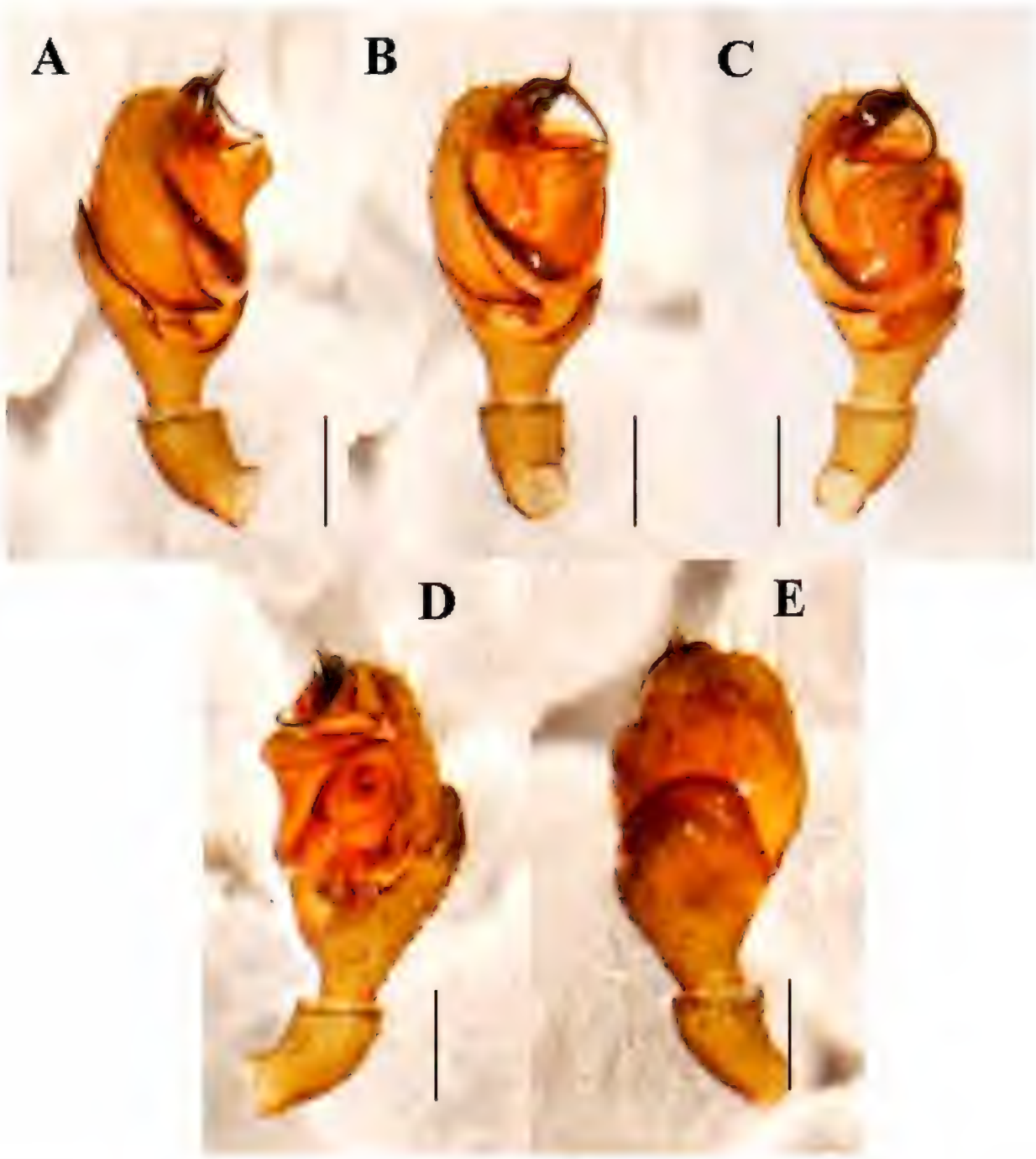

Fig. 2. *Diplocephalus graecus* (O. Pickard-Cambridge, 1873) ♂, palp. A. lateral view. B. prolateral view. C. ventral view. D. retrolateral view. E. dorsal view. (Scale bar: 0.1 mm).

Fig. 3. *Diplocephalus graecus* (O. Pickard-Cambridge, 1873), ♂, palp SEM micrograph, retrolateral view.

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First record of *Pardosa parathompsoni* Wang & Zhang, 2014 (Araneae: Lycosidae) from biodiversity hotspot Western Ghats with additional information on cheliceral morphology

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Abstract

Taxonomic findings from biodiversity hotspots are always fascinating because of their vulnerability. In this paper we are reporting *Pardosa parathompsoni* Wang & Zhang, 2014 for the first time from Western Ghats region of India along with additional information on cheliceral morphology.

Keywords: Spider, Lycosidae, *Pardosa parathompsoni*, India.

Introduction

Western Ghats is one of the major biodiversity hotspots which serves as the paradise of biological wealth. New findings of fauna and flora from the region have great importance in the current climate change scenario. *Pardosa* C.L. Koch, 1847 is the largest genus in family Lycosidae (World Spider Catalog, 2022). *Pardosa parathompsoni* Wang & Zhang, 2014 belongs to *P. nebulosa* species-group, first reported from China and later reported from India (Wang & Zhang, 2014; Prasad *et al.*, 2022). This paper documents second report of the species from India and first from Western Ghats with additional information on cheliceral morphology.

Methodology

All specimens were collected by hand picking method and preserved in 70% ethanol and were studied, photographed and measured using a Leica M205C stereomicroscope, a Leica DFC4500 Camera, and LAS software (Ver.4.13). Epigynes were dissected and internal genitalia were cleared in 10% potassium hydroxide (KOH) solution. Male palp was separated and photographed. Ocular measurements were taken after placing the specimen dorsally. Leg measurements are shown as: total length (femur, patella + tibia, metatarsus, tarsus). All measurements are given in millimetres (mm).

Abbreviations used in the main text and figures are: ALE = anterior lateral eye, AME = anterior median eye, BS = base of septum, CD = copulatory duct, CO = copulatory opening, E = embolus, FD = fertilization duct, Ho = hood, MA= median apophysis, MOQ = median ocular quadrangle, Pa = palea, PLE = posterior lateral eye, PME = posterior median eye, Sp = spermatheca, SS = septal stem, St = subtegulum, TA= tegular apophysis, T = tegulum.

Systematics

Family Lycosidae Sundevall 1833
Genus *Pardosa* C.L. Koch 1847
Pardosa nebulosa-group
Pardosa parathompsoni Wang & Zhang 2014
(Figs. 1A-D, 2A-E)

Pardosa parathompsoni Wang & Zhang, 2014: 228, figs. 1A-E, 2A-J, (♂♀).
Pardosa parathompsoni Prasad *et al.*, 2022: 1591, figs. 1A-F (♂♀).

Material examined

INDIA, Kerala: 5♀♀ 1♂ from grassland in Gavi, Pathanamthitta district, Kerala, India (9°43.49'N, 77°16.01'E) 1035.9 m a.s.l., 8 October 2021, R.S. Abhijith.

Diagnosis

Habitus of both sexes morphologically very similar to other members of *Pardosa nebulosa*-group, the genitalia is close to *P. sumatrana* (Thorell, 1890), but can be distinguished by following set of characters: Epigynum with a short vase-shaped septum; SS broader in anterior and posterior ends with small hoods; Sp vertical with an inward angle; Male palp with a TA having a protrusion; Pa with a small sharp protrusion mid-retrolaterally towards the MA; MA comparatively stout with a slightly curved tip.

Description

Female from Gavi, Pathanamthitta (Figs. 1A-B): Total length 4.81-4.92. Prosoma 2.58 long, 1.60 wide. Opisthosoma 2.23 long, 1.45 wide. Carapace yellowish brown with a distinct longitudinal fovea. Fovea non-uniform in width, wider at both ends. Green spots along lateral edges of carapace. Median band greenish yellow, broader near ocular area and narrower in thoracic area. A small bifurcated extension of median band extended into the ocular area. Paramedian bands broad, dark greenish brown, uniform in width, continuous. Two comma-shaped patterns near ocular area. Paramedian bands joined near the pedicel. Ocular area black and hairy except bifurcated extension of median band. Head region flanked steep without any projections.

Eye sizes and inter-distances: AME 0.08, ALE 0.05, PME 0.18, PLE 0.13, AME-AME 0.06, AME-ALE 0.03, PME-PME 0.24, PME-PLE 0.26. MOQ wider posteriorly. Clypeus height 0.22. Labium dark grey, subequal in length and breadth. Chelicera with 3

promarginal and 3 retromarginal teeth. One of the promarginal teeth very small. Sternum heart-shaped, covered sparsely with black hairs. V-shaped dark band present away from the margin of sternum. Legs yellow with dark greenish yellow annuli. Leg measurements: I 4.43 (1.15, 1.60, 0.87, 0.81); II 4.16 (0.99, 1.50, 0.97, 0.70); III 4.01 (1.07, 1.31, 0.98, 0.65); IV 6.05 (1.52, 1.84, 1.71, 0.98). Leg formula: 4123. Palp 1.69 (0.56, 0.64, 0.49). Opisthosoma long oval. Dorsum dark yellowish brown with several lateral bands like patterns. Lanceolate pattern present medially. Venter yellow. Posterior spinnerets larger than anterior ones.

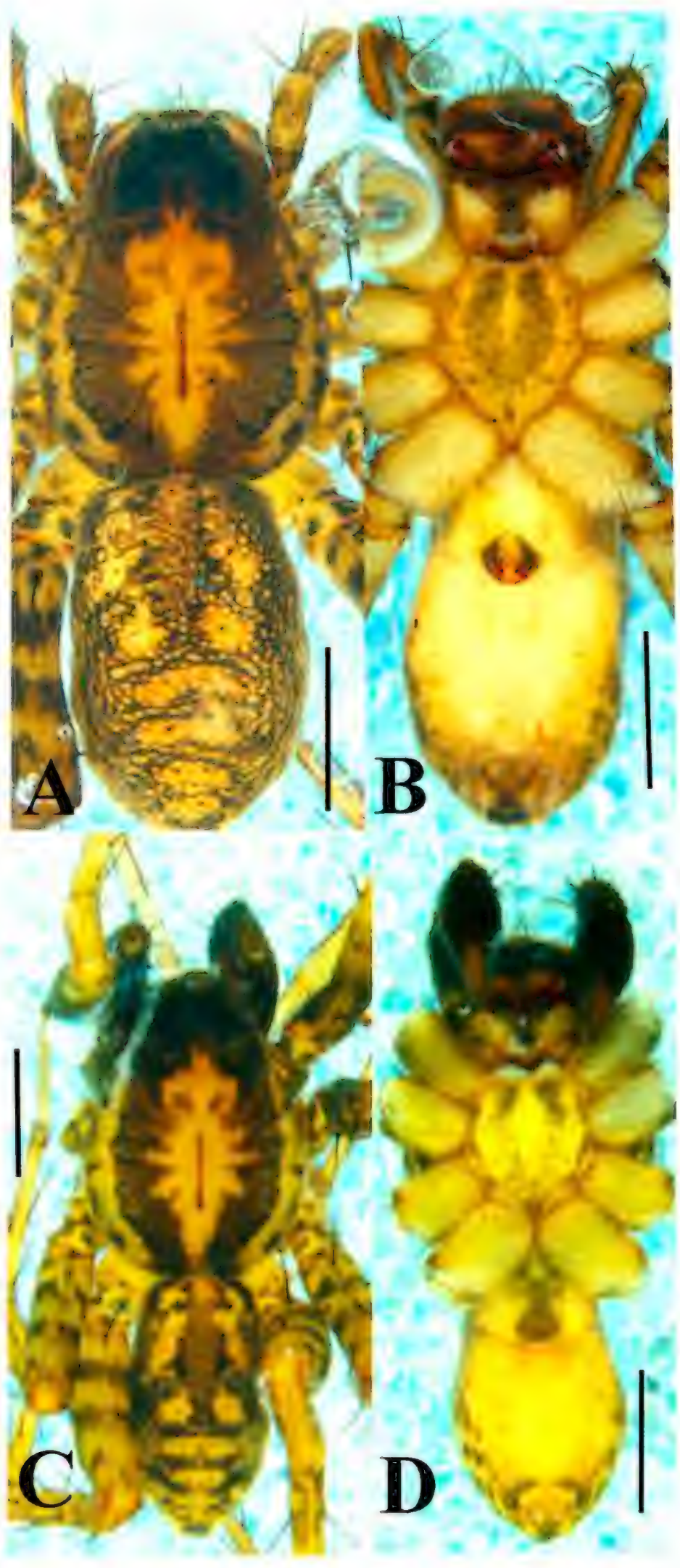

Fig. 1. *Pardosa parathompsoni* Wang & Zhang, 2014, Habitus. A-B. female. C-D. male. A, C. dorsal view. B, D. ventral view. (Scale bars: 1 mm).

The epigynum (Fig. 2A): short septum and non-prominent hood present. Internal genitalia (Fig. 2B): septum anchor shaped, SS wider near hood and BS, tapered medially; CD positioned laterally to SS with a slight upward angle; Sp longer than wide, positioned vertically at an inward angle to the SS, the proximal end angled away and bulged slightly beyond the epigyne area, tip angled towards septum, positioned higher than septal hood; FD small and close to base of CD.

Male from Gavi, Pathanamthitta (Figs. 1C-D): Morphologically similar to female, slightly smaller in size. Total length 3.91. Prosoma 2.01 long, 1.59 wide. Opisthosoma 1.90 long, 1.09 wide. Carapace yellowish brown with a distinct longitudinal fovea. Fovea almost uniform in width, only slightly wider posteriorly. Green spots along the margins of carapace, continuous than in female. Median band greenish yellow, broader near ocular area and narrower around the pedicel. A small bifurcated extension of median band trespassed into the dark ocular area. Paramedian bands broad, dark greenish brown, uniform in width, a few protrusions extended towards median band. Ocular area black and hairy except bifurcated extension of median band. Head region flanked steep without any projections.

Eye sizes and inter-distances: AME 0.06, ALE 0.05, PME 0.17, PLE 0.13, AME-AME 0.06, AME-ALE 0.04, PME-PME 0.24, PME-PLE 0.28. Anterior eye row slightly procurved. MOQ wider posteriorly. Clypeus height 0.20. Labium grey, subequal in length and width. Chelicera with 3 promarginal and 3 retromarginal teeth. One of the promarginal teeth very small (Fig. 2C). Sternum heart-shaped, clothed sparsely with black hairs. Dark band along the margin of sternum. Legs yellow with dark greenish yellow annuli. Leg measurements: I 5.01 (1.41, 1.80, 1.11, 0.69); II 4.93 (1.36, 1.76, 1.01, 0.80); III 4.63 (1.25, 1.55, 1.20, 0.63); IV 7.23 (1.75, 2.30, 2.17, 1.01). Leg formula: 4123. Opisthosoma long oval, slender than that of female. Dorsum dark yellowish brown with several lateral bands. Venter yellow with a dark brown pattern near pedicel. Posterior spinnerets larger than anterior ones.

Male Palp (Figs. 2D-E): dark, hairy; T large, TA small, tapered tip and directed downwards; St small, prolaterally positioned; Pa large, globular and positioned retrolaterally with a small sharp protrusion mid-retrolaterally towards the MA; MA with a slightly curved tip, horizontally extended retrolaterally, stout; embolus with a fine tapered end directed upwards, originated prolaterally, extended retrolaterally.

Distribution. China (Yunnan)(Wang & Zhang, 2014), India (Odisha)(Prasad *et al.*, 2022) new to Western Ghats region.

Remarks

Genital characters rather than other morphological characters have taxonomic importance in *Pardosa* genus. *Pardosa parathompsoni* was first described from China by Wang & Zhang (2014). The original description is extremely precise and mainly based on genitalic characters. Clear photographs and figures are also given. Description and photographs of copulatory organs are matching to our collected specimens. Body sizes of our specimens seem to be on a lower side than the Chinese specimens. Female body size is comparable, but size of male is smaller. This may be due to the difference in environmental conditions of two collection sites which are thousands of miles apart.

Notes on cheliceral morphology (Fig. 2C): Chelicera 0.6 mm, dark brown, fang sturdy, light brown. Chelicera with 3 promarginal and 3 retromarginal teeth. The number of promarginal teeth in chelicerae is different from the original description and description by Prasad *et al.* (2022), *i.e.* "two promarginal and three retromarginal teeth".

One of the teeth is comparatively very small and masked by a tuft of strong hairs. So, it is clear that this species shows variation in cheliceral teeth number.

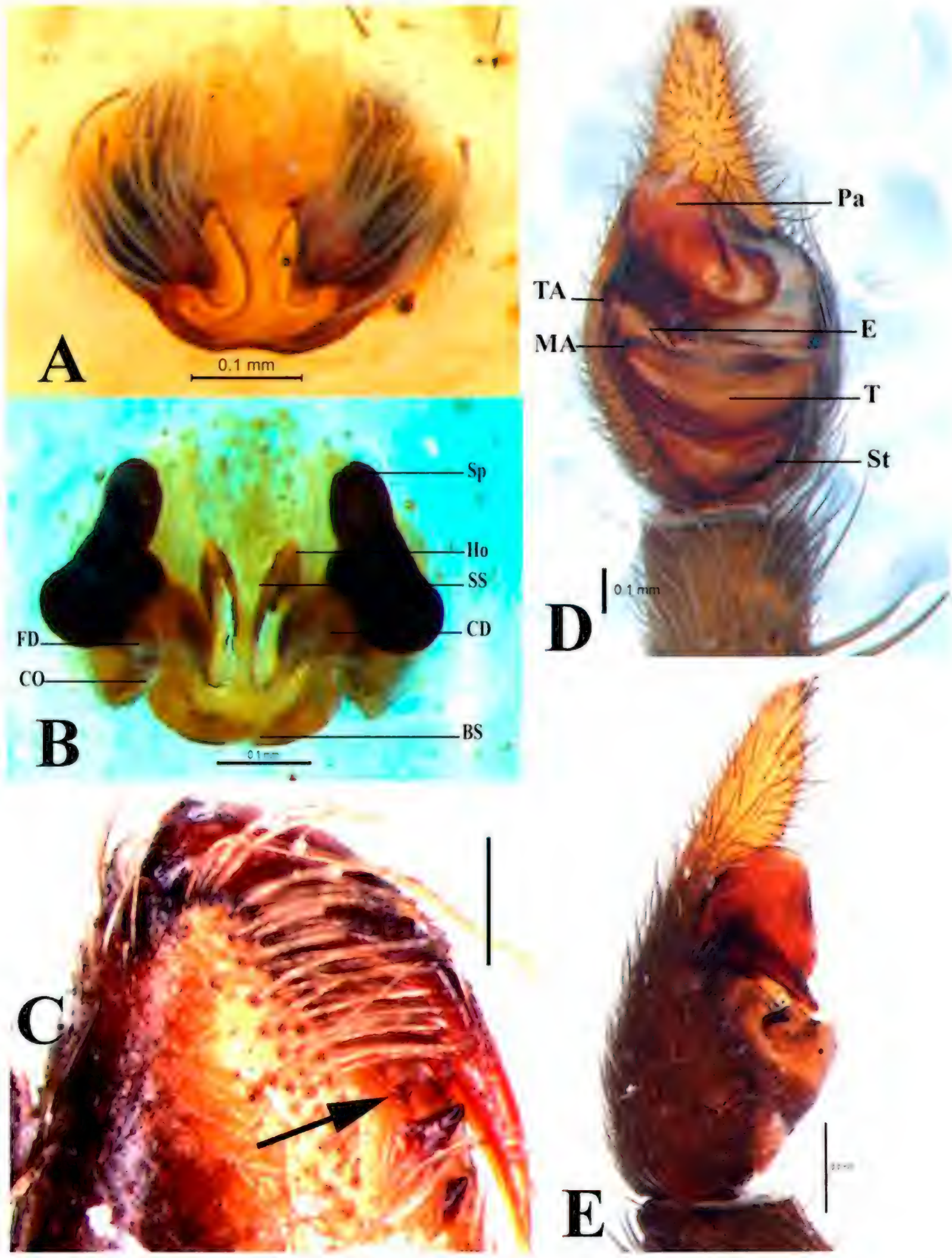

Fig. 2. *Pardosa parathompsoni* Wang & Zhang, 2014. A-B. Female epigyne. A. ventral view. B. dorsal view, cleared. C. male left chelicera; arrow indicates the small third promarginal teeth. D-E. Male palp. D. ventral view. E. retrolateral view. (Scale bars: 0.1 mm).

Natural history

The *P. parathompsoni* spiders were found in single continuous grassland. The grassland was adjacent to rocky region. The area contained discontinuous water logging

marshy regions. The day was sunny with slightly drizzled previous night. The entire above mentioned habitat conditions are ideal for the flourishing of lycosids. The grass vegetation holds great population of prey insects, water logged areas and less anthropogenic disturbance might be the reason for abundant lycosid population. *Pardosa sumatrana* was the most abundant species which far exceeds other species. The time of collection was also ideal for observing spiders. Most of the spiders were sexually mature, but, few with egg cases or spiderlings. Sub-adults were found, but not many. Male individuals were also less in number, literally one in ten compared to females. But all the collected males were sexually matured with well-developed genitalia. On field, the observed males had great vigor, faster and active than female counterparts and spotted with raised well developed, dark coloured palp. This clearly indicates that time was mating period of these species. The low number of males might be because of the wandering nature of mature males in search of females for mating and reducing the sexual competition in the habitat. More studies are required to analyse the sexual selection of lycosids and whether the males travel to distant areas for avoiding competition.

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First description of the male comb-footed spider, *Chrysso urbasae* (Tikader, 1970) (Araneae: Theridiidae) with redescription of the female

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Abstract

The male of *Chrysso urbasae* (Tikader, 1970) is first described from Kerala, India with redescription of female. This species was originally described from Sikkim, India only with female specimen. Morphological description of male and redescription of female with detailed photographs are provided.

Keywords: Spider, first report, redescription, Theridiidae, *Chrysso*, India.

Introduction

The genus *Chrysso* O. Pickard-Cambridge, 1882 contains 64 known species with the type species *C. albomaculata* O. Pickard-Cambridge, 1882 (World Spider Catalog, 2022). *Chrysso urbasae* (Tikader, 1970) was first described by Tikader in 1970 as *Linyphia urbasae*. The species was mistakenly placed in the genus "*Linyphia*". Breitling transferred *L. urbasae* to *C. urbasae* in 2015 by analyzing the habitus and diagram of epigyne in the original description (Breitling, 2015). Although the precise positioning of the species is ambiguous, the habitus image and the diagram of female genitalia along with parental care exhibited by *C. urbasae* certainly validates its position in this heterogenous polyphyletic genus *Chrysso*, in family Theridiidae (Barrion *et al.*, 2013; Jin, 2018; Sen *et al.*, 2015). Even though they are common in Southeast Asia, the male of this

species has not been reported yet. In this present paper, the male of *C. urbasae* is described for the first time from Kerala, India with detailed photographs.

Material and Methods

All specimens were collected by visual searching and hand collecting into plastic vials containing 75% ethanol. Morphological examination was undertaken under a Leica M205C stereomicroscope. The digital images were taken using a Leica DMC4500 digital camera attached to the stereomicroscope and edited with the software package Leica Application Suite (LAS), version 4.3.0 LAS montage facility. Female genitalia was dissected as in Levi (1965) and Chen *et al.* (2020) and examined after digesting with KOH. Leg measurements are shown as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are in millimetres. The studied specimens are stored in the Centre for Animal Taxonomy and Ecology (CATE), Department of Zoology, Christ College (Autonomous), Irinjalakuda, Kerala, India.

Abbreviations used: Eyes: ALE = anterior lateral eye, AME = anterior median eye, PLE = posterior lateral eye, PME = posterior median eye. Palp: C = conductor, Cy = cymbium, E = embolus, MA = median apophysis, MH = median haematodocha, TTA = terminal tegular apophysis, ST = subtegulum. Epigyne: CD = copulatory duct, CO = copulatory opening, FD = fertilization duct, S = spermatheca.

Taxonomy

Family Theridiidae Sundevall, 1833

Genus *Chrysso* O. Pickard-Cambridge, 1882

Chrysso urbasae (Tikader, 1970)

Diagnosis: Abdomen longer than wide, eyes on a slightly elevated region of the carapace, first metatarsus at least two times longer than tarsus in female. Abdomen lacks spines or hairs. Most of the species even females are vibrantly coloured (Figs. 1A, 2A). Presence of free median apophysis and TTA (Figs. 1C-E). Epigyne with indistinct small openings and oval spermathecae without any convolutions (Figs. 2B-C).

Material examined: 2♀♀ 3♂♂ (CATE1172856) Ranipuram, Kerala, India (12°25'15"N, 75°21'05"E) E.H. Vishnudas, 28.10.2022.

Description of Male: Total length 2.54. Cephalothorax 1.26 long, 1.17 wide; longer than wide, brick orange in colour (Fig. 1A). Carapace slightly convex. Clypeus 0.2 high. Anterior eye row recurved, posterior row nearly straight. Inter-distances of eyes: AME-AME 0.1, AME-ALE 0.02, PME-PME 0.09, PME-PLE 0.06. ALE and PLE juxtaposed (Fig. 1A). Chelicerae brownish orange, 2 promarginal teeth, and 1 retromarginal tooth. Endites orange and labium brownish orange, longer than wide, sternum margin yellowish orange, medially yellowish. Sternum nearly heart-shaped, orange. Pale orange legs with sparse spines. Legs I and II with conspicuous red-brown annuli in the distal parts of femur, patella, tibia, metatarsus, and tarsus. Leg measurements: I 8.61 (2.52, 0.56, 2.07, 2.09, 1.37); II 5.01 (1.60, 0.34, 1.18, 1.13, 0.76); III 3.02 (0.99, 0.18, 0.81, 0.64, 0.40); IV 5.46 (1.79, 0.32, 1.32, 1.34, 0.69). Leg formula: 1423. Abdomen 1.3 long, 0.9 wide, oblong, distally tapering, dorsally brownish yellow with 4 thick black markings at the distal end (Fig. 1A). Ventral side of the abdomen has a characteristic thick cuticular projection that resembles the female's epigyne. Middle portion of the ventrum of abdomen has thick black colour except for the rim region and the area of spinnerets. The rim has two pairs of bright white spots at both proximal and distal ends (Fig. 1B). Palp:

Cymbium not extending beyond alveolus. Embolus curved and pointed towards the end. Conductor short, bluntly ending with embolus. MA free with TTA. TTA with a wider base and ending closer to the embolus. ST semi-ovular (Figs. 1C-E).

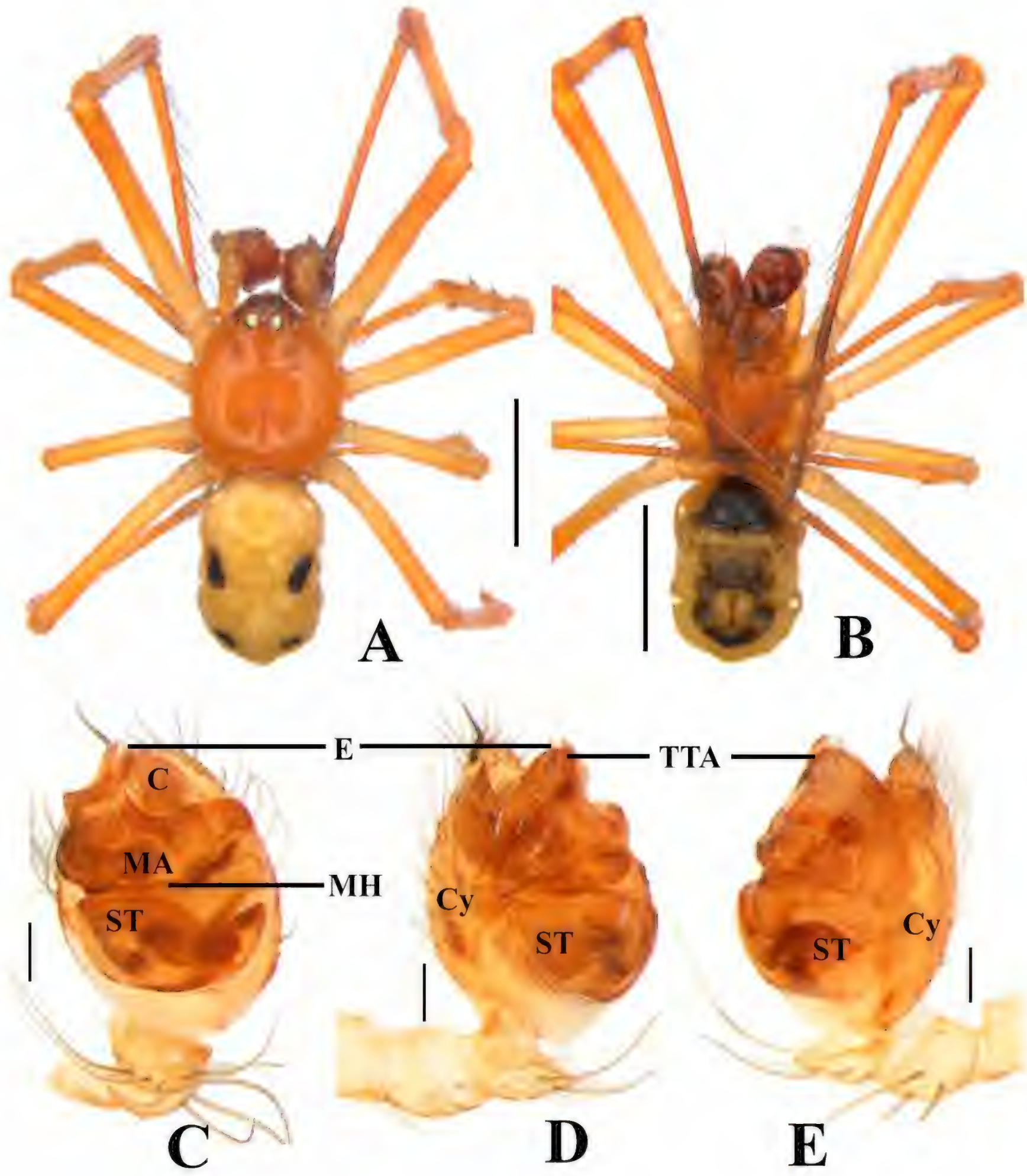

Fig. 1. *Chrysso urbasae* (Tikader, 1970) male. A-B. Habitus. A. dorsal view. B. ventral view. C-E. Palp. C. ventral view. D. prolateral view. E. retrolateral view.
(Scale bars: (A-B) = 1 mm, (C-E) = 0.1 mm).

Redescription of female: Total length 3.74. Carapace slightly longer than wide, 1.13 long and 1.12 wide and almost round somewhat convex. Eyes translucent, anterior row recurved, posterior row straight, lateral eyes small, contiguous, and the base of all eyes encircled by black rings. Inter-distances of eyes: AME-AME 0.09, AME-ALE 0.04,

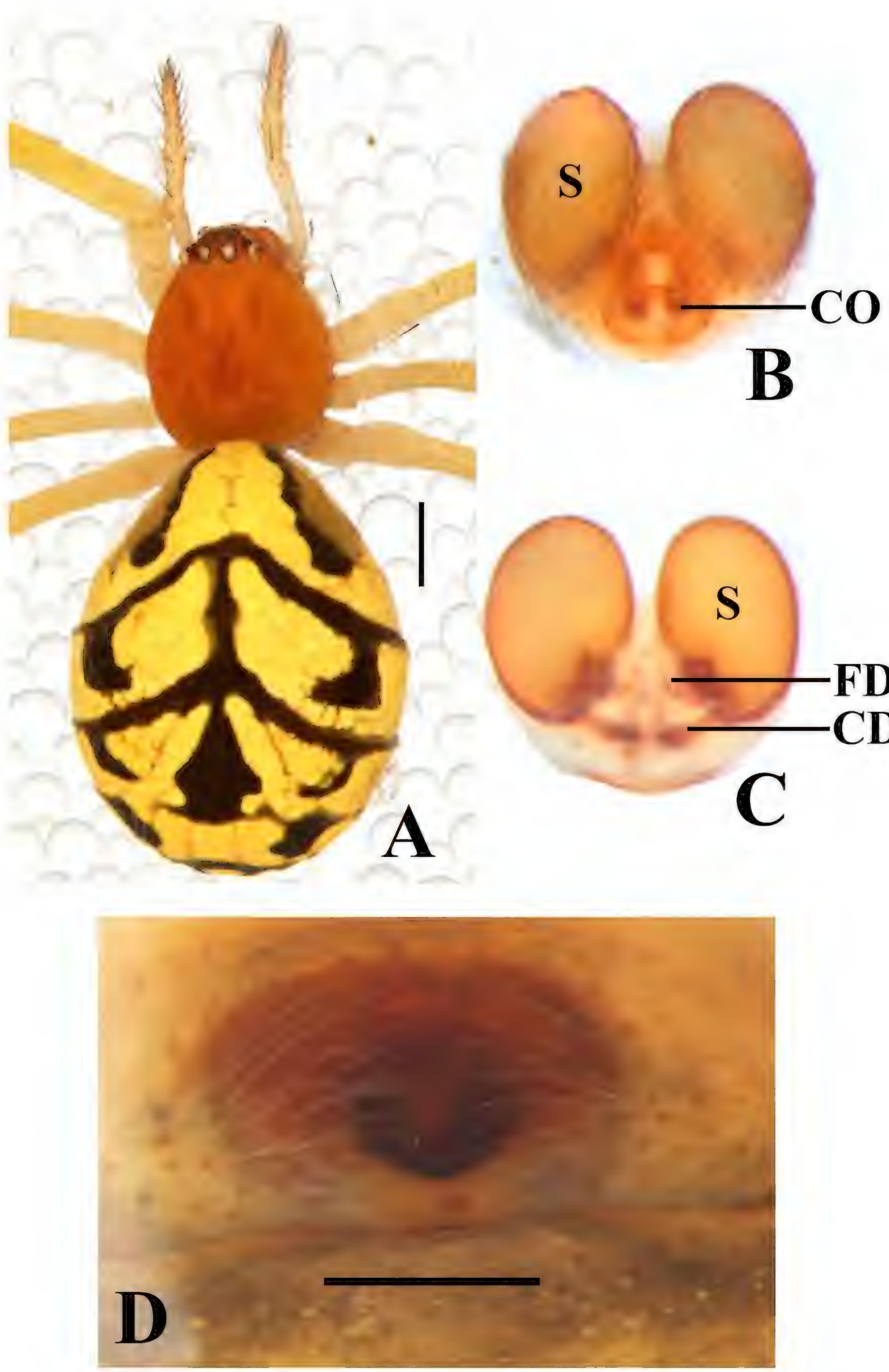

Fig. 2. *Chrysso urbasae* (Tikader, 1970) female. A. Habitus, dorsal view. B-D. Epigyne. B. ventral view. C. dorsal view (B-C. cleared). D. in situ view.
(Scale bars: A = 1 mm, D = 0.1 mm).

PME-PME 0.11, PME-PLE 0.08. ALE and PLE juxtaposed (Fig. 2A). Chelicerae brownish orange, 2 promarginal and 2 retromarginal teeth. Endites pale brown labium brownish orange. Sternum heart-shaped, longer than wide and pointed posteriorly. Abdomen longer than wide, elliptical, bright yellow with black symmetrical patterns dorsally (Fig. 2A). Ventrum of the abdomen dark brown. Lateral side of the abdomen has two white spots. Leg measurements: I 13.71 (4.23, 0.51, 3.38, 3.80, 1.79); II 8.97 (3.01, 0.59, 2.05, 2.04, 1.28); III 5.56 (1.91, 0.46, 1.01, 1.45, 0.73); IV 9.06 (2.88, 0.51, 2.12, 2.50, 1.05). Leg formula: 1423. Legs clothed with hairs and spines. Epigynum as in Fig. (2D). Circular copulatory opening. Copulatory duct narrow, moderately long tubular without any convolutions. Spermatheca perfectly oval with short fertilization duct. Fertilization duct curved starting from the base of spermatheca extending towards the mid-region (Figs. 2B-C).

Discussion

The female specimen seems to be *C. urbasae* with markings and patterns on the dorsal side of the abdomen. The male specimen was found in the same web underneath a green leaf and markings seem very similar to the female, and the characteristics of the palpal organ confirmed the genus *Chrysso*. We, therefore, identified it as the male of *C. urbasae*. The female specimen was examined thoroughly and noticed some significant additional information regarding the general morphology and the structure of genitalia hence, redescribed.

Acknowledgments

We are grateful to the Rev. Fr Dr Jolly Andrews CMI, Principal, Christ College (Autonomous), Irinjalakuda, Kerala, India for providing facilities for undertaking this work. We express our gratitude to research scholars of CATE. This study was funded by the DST-SERB Major Research Project EEQ/2021/000453. The first author acknowledges egrantz: SCST Development Department, Government of Kerala, India.

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Serket (2022) vol. 19(1): 90-94.

First report of the kleptoparasitic spider *Argyrodes miniaceus* (Doleschall, 1857) (Araneae: Theridiidae) from India

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Abstract

The genus *Argyrodes* Simon, 1864 includes kleptoparasitic spiders. The synanthropic spider *Argyrodes miniaceus* is specialised in the invasion and exploitation of the webs created by members of family Araneidae. In the present study, *Argyrodes miniaceus* (Doleschall, 1857) is reported for the first time from the Western Ghats of India.

Keywords: Taxonomy, *Argyrodes*, New report, India.

Introduction

Theridiidae Sundevall, 1833, the tangle-web spiders, cobweb spiders, and comb footed spiders are one of the largest spider families in the world with 2538 species and 124 genera. *Argyrodes* Simon, 1864 is the fourth largest genus in the family with 94 species and 4 subspecies from the world and 15 species from India (World Spider Catalog, 2022). Kleptoparasites are morphologically and behaviourally adapted to their foraging behaviour, the genus *Argyrodes* spiders have long legs, leg I longest and leg III always shortest. Comb of tarsus IV often absent or reduced to a few setae. Abdomen sometimes higher than long, but usually extending beyond spinnerets, often with tubercles on posterior end.

Argyrodes miniaceus (Doleschall, 1857) occupies a varied range of synanthropic niches. Kleptoparasitism is an inherent behaviour for resources acquisition (Dupérré &

Tapia, 2020) and *A. miniaceus* is a non-opportunistic kleptobiont. *A. miniaceus* is closely related to *A. flavescens* O. Pickard-Cambridge, 1880 but can be distinguished by the presence of a large black spot on the posterior part of the abdomen, slender embolus, and copulatory duct longer than the diameter of spermatheca (Kim & Kim, 2007). Here we are reporting the *Argyrodes* species, *A. miniaceus* (Doleschall, 1857) for the first time from India.

Material and Methods

All specimens were collected by hand picking method and preserved in 70% ethanol and were studied, photographed and measured using a Leica M205C stereomicroscope, a Leica DFC450 Camera, and LAS software (Ver.4.13). Epigyne was dissected and internal genitalia were cleared in 10% potassium hydroxide (KOH) solution. Male palp was separated and photographed. Ocular measurements were taken after placing the specimen dorsally. Leg measurements are shown as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are given in millimetres (mm).

Abbreviations used in the main text are: AER = anterior eye row, ALE = anterior lateral eye, AME = anterior median eye, C = conductor, CATE = Centre for Animal Taxonomy and Ecology, Department of Zoology, Christ College (Autonomous), Irinjalakuda, Kerala, India, CD = copulatory duct, CO = copulatory opening, Cy = cymbium, E = embolus, FD = fertilization duct, MA= median apophysis, PER = posterior eye row, PLE = posterior lateral eye, PME = posterior median eye, S = spermatheca, St = subtegulum, TTA= terminal tegular apophysis.

Taxonomy

Family Theridiidae Sundevall, 1833
Genus *Argyrodes* Simon, 1864
Argyrodes miniaceus (Doleschall, 1857)

Diagnosis: This species closely resembles *Argyrodes flavescens* O. Pickard-Cambridge, 1880, but can be distinguished from the latter by the structure of female genitalia and the shape of embolus of male palp (Tanikawa *et al.*, 1996). Cephalothorax light orange in colour, eyes (AME and PME) on tubercle and hairy clypeus. Abdomen pale brown in colour, triangular in shape with the presence of silvery spots. Embolus large with one pointed branch. Conductor flat and triangular in shape (Figs. 1-2).

Material examined: 5♂♂ 5♀♀ (CATE) Kottathara, Palakkad, Kerala (11°07'51.2"N 76°43'17.5"E) K.K. Sibi & A.V. Sudhikumar, 02.07.2022.

Description. Male. Small-sized. Total body length 2.86-3.07, relatively smaller than female. Prosoma 1.52 long, 0.79 wide. Opisthosoma 1.43 long, 0.88 wide. Carapace light orange in colour with a transverse fovea. Shield shaped sternum, widest at first coxae and not projected between 4th coxae. Opisthosoma pale brown in colour and triangular shape, presence of 4 silvery spots on the dorsal side of the abdomen and 2 silvery spots postero-laterally. AER straight and PER slightly procurved in frontal view (Fig. 1A). Eyes inter distances AME-AME 0.15, AME-ALE 0.35, ALE-ALE 0.56, AME-PME 0.12, PME-PME 0.89, PLE-PLE 0.53, PME-PLE 0.29. Chelicerae with three pro-marginal teeth, one retro-marginal tooth, fang reddish brown in colour. Absence of scopula and lateral condyle. Legs are dark yellowish brown with pale yellow colour in tarsus region. Leg I length 12.19 (3.46, 0.48, 3.30, 3.40, 1.55), Leg II 7.12 (2.07, 0.34, 1.76, 1.84, 1.11), Leg

III 4.30 (1.41, 0.29,0.79, 1.07, 0.74), Leg IV 6.31 (2.01, 0.32, 1.45, 1.68, 0.85). Leg formula 1243. Femur I two times as long as prosoma. Clypeus height 0.06, pale orange in colour. Labium length 0.18, width 0.26, pale orange and semi-circle.

Male palp (Figs. 1B-D). Cymbium yellowish orange in colour and cymbial hook modified at the distal cymbium. Patellar apophysis and RTA absent. Terminal tegular apophysis curved, distal end dark and serrated. Embolus large with one pointed branch. Conductor flat and triangular in shape. Median apophysis situated at the lateral part of tegulum and hooked (Fig. 1B).

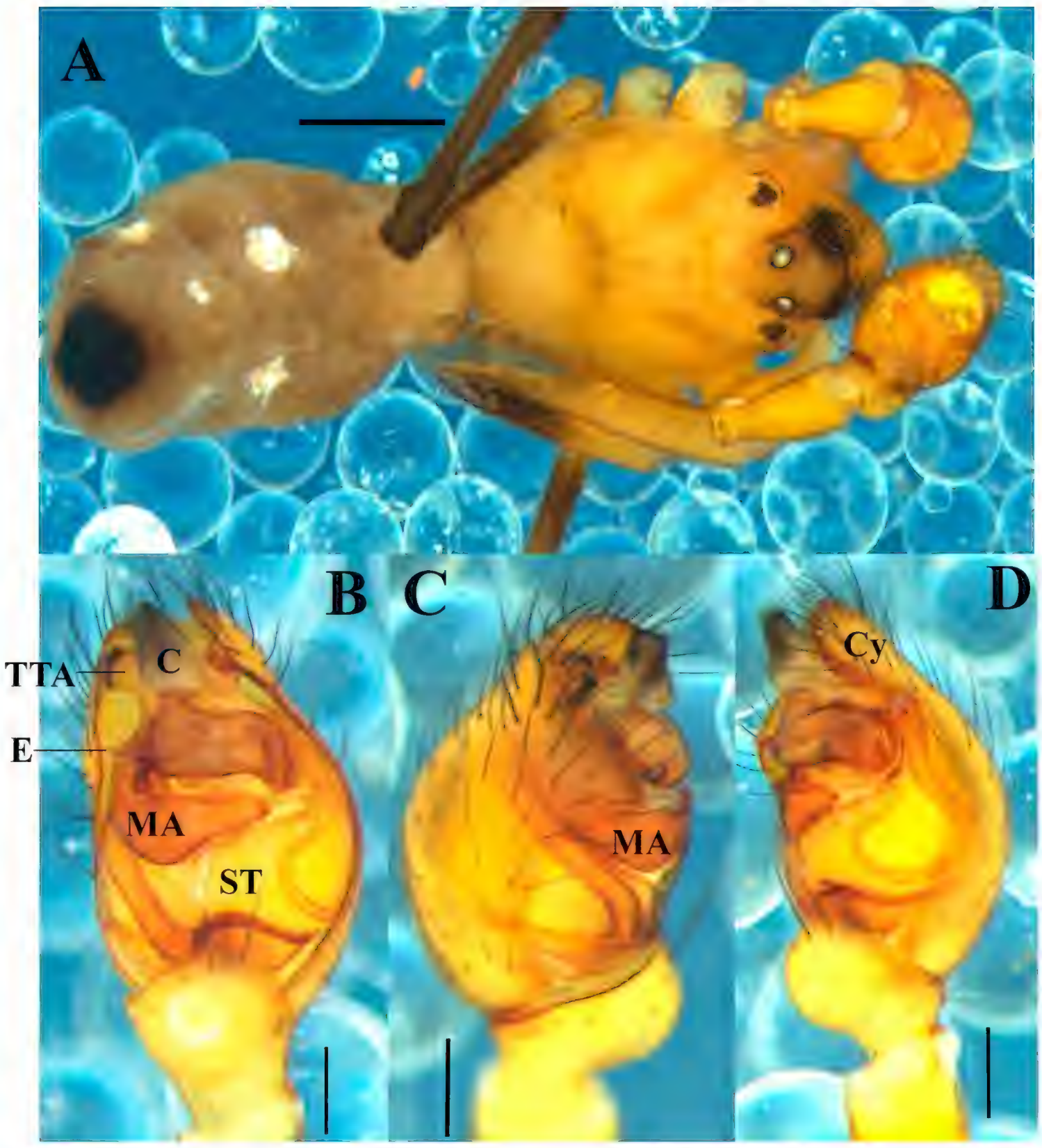

Fig. 1. *Argyrodes miniaceus* (Doleschall, 1857) male. A. Habitus, dorsal view. B-D. Palp. B. ventral view. C. prolateral view. D. retrolateral view. (Scale bars: A = 0.5 mm, B-D = 0.1 mm).

Female. Total length 4.15-4.35. Prosoma 1.56 long. 1.12 wide. Opisthosoma 2.63 long, 2.12 wide. Longer than male. Large black spot in the posterior end of the dorsum of the abdomen (Fig. 2A). Carapace pale brown, rounded pentagonal and V shaped silver marking laterally on the abdomen (Fig. 2C). Presence of 2 pairs of silver spots on the posterior dorsal side of abdomen (Fig. 2A). Fovea slightly depressed and transverse. Sternum light brown, posterior end not pointed like male and shield shaped. Spinnerets with black markings (Fig. 2B).

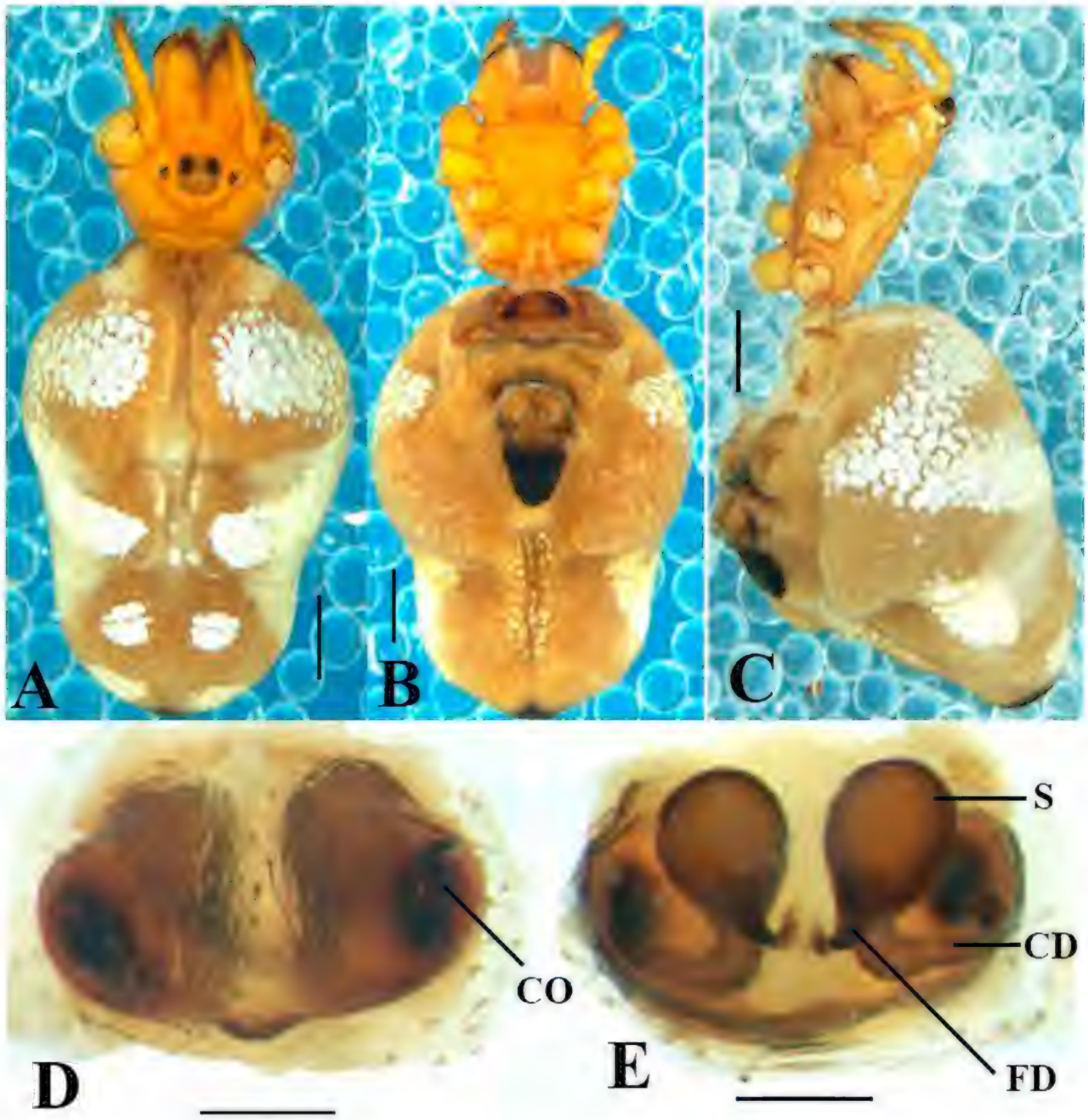

Fig. 2. *Argyrodes miniaceus* (Doleschall, 1857) female. A-C. Habitus. A. dorsal view. B. ventral view. C. lateral view. D-E. Epigyne. D. ventral view. E. dorsal view. (Scale bars: A-C = 0.5 mm, D-E = 0.1 mm).

AER row recurved and PER almost straight from above. Eyes inter distances AME-AME 0.18, AME-ALE 0.20, AME-PME 0.09, ALE-ALE 0.47, PME-PME 0.12, PLE-PLE 0.49, PME-PLE 0.13. Chelicera and endite turbid yellowish brown. Chelicerae without scopula and lateral condyle; three promarginal teeth, one retromarginal tooth. Labium length 0.22, width 0.31, semi-circle and light orange in colour (Fig. 2B). Clypeus height 0.15, pale orange. Legs turbid yellow and distal end of each segment dark. Leg I length 11.37 (3.40, 0.47, 2.96, 3.24, 1.30), Leg II 6.32 (2.05, 0.45, 1.55, 1.44, 0.83), Leg III 3.26 (1.15, 0.26, 0.76, 0.63, 0.46), Leg IV 6.29 (2.14, 0.39, 1.42, 1.60, 0.74). Leg formula 1243. Legs of female are shorter comparing to male.

Epigyne simple with a pair of semi-transparent epigynal protuberances (Fig. 2D), it has sclerotised broad dark plate with 2 spherical spermathecae, each of them not overlapped with indistinct stalks and bases, narrower posteriorly. Fertilization ducts are small, parallel and located between spermathecae. Copulatory duct is long and U shaped (Fig. 2E).

Natural History
Most of the specimens were collected from undisturbed and abandoned houses. They are synanthropic and kleptoparasite. Mainly wander on the edge of a large orb webs of *Argiope* and *Nephila* species, where it survives by scavenging small insects that land on the web. Compared to female the foraging behaviour is less observable in males (Yu *et al.*, 2022). Also, they are irregular-web building spiders found on the web of *Nephilengys malabarensis* (Walckenaer, 1841)

Distribution. Korea, Japan to Australia (World Spider Catalog, 2022), **New to India**.

Discussion

In 1857, Doleschall originally described *A. miniaceus* with lack of proper illustrations of somatic and genital characters. Genital photographs in Tanikawa *et al.* (1996) are similar to our specimens. Genitalic figures in Kim & Kim (2007) and Yoshida (2003) also confirmed our species. Detailed examination of this species characterized by abdomen with a large black spot postero-laterally and slender embolus. The female with genital pore in lateral part and connecting duct only stretched to spermathecae. These characteristic features made clear that our specimens belong to *A. miniaceus*.

Acknowledgments

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New species of genus *Hamataliwa* Keyserling, 1887 (Araneae: Oxyopidae) from India

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Abstract

New species of Lynx spider, *Hamataliwa rhombiae* sp. n. is described from Perepara dam area, a part of western Ghats of Kerala, India. Detailed morphological description, diagnostic features, and illustrations of the female of this species is given.

Keywords: *Hamataliwa rhombiae*, Taxonomy, New species, Kerala, India.

Introduction

The spiders of family Oxyopidae are easily recognized by six of their eight eyes arranged in a hexagon-like pattern. They are diurnally active, and many species are found running swiftly or jumping with great agility among low shrubs and herbs. The habits of these spiders and their relatively keen eyesight have earned for them the name lynx spiders (Brady, 1964). *Hamataliwa* Keyserling, 1887 is the second largest genus of the family Oxyopidae, and currently contains 86 species (World Spider Catalog, 2022) with so far 8 species are reported from India. The copulatory organs of *Hamataliwa* and genus *Tapponia* appeared to be uniform, whereas the somatic characters were much diverse (Deeleman-Reinhold, 2009). The general form of the epigyne in *Hamataliwa* is a semi-circular or U-shaped, heavily sclerotized rim surrounding a shallow median depression with a characteristic shape in each species (Brady, 1970). The current study deals with the record and description of a new species of genus *Hamataliwa* female collected from Perepara dam of Kerala, India.

Material and Methods

Lynx spider specimens were collected from the premises of tropical rain forests of Western Ghats of Kerala, India. Collection was done by hand picking. The specimens were preserved in 70% ethanol and studied with a Leica M205 C stereomicroscope. The microphotographic images were taken by means of Leica DMC 4500 digital camera attached to Leica M205 C stereomicroscope, with the software package Leica Application Suite (LAS), version 4.3.0. LAS montage facility. The image plates were prepared using Adobe Photoshop CC version 14.0 x 64.

Epigyne was dissected and cleared in 10% potassium hydroxide (KOH) solution. It was cleared and photographed. Leg measurements are showed as: total length (femur, patella, tibia, metatarsus, tarsus). All measurements are in millimetres (mm). The studied specimens were deposited in the reference collection at the Centre for Animal Taxonomy and Ecology (CATE), Department of Zoology, Christ College (Autonomous), Irinjalakuda, Kerala, India.

Abbreviations used in the text and figures are as follows (according to: Tang & Li, 2012; Baehr *et al.*, 2017; Lo *et al.*, 2021): AER = anterior eye row, AL = abdomen length, ALE = anterior lateral eye, AME = anterior median eye, AW = abdomen width, CD = copulatory duct, CL = cephalothorax length, CW = cephalothorax width, ECD = extension of copulatory duct, FD = fertilization duct, PER = posterior eye row, PLE = posterior lateral eye, PME = posterior median eye, S = spermatheca, TL = total length. Spination abbreviations: do = dorsal, pl = prolateral, rl = retrolateral, v = ventral.

Taxonomy

Hamataliwa Keyserling, 1887
Type species: *Hamataliwa grisea* Keyserling, 1887

Hamataliwa rhombiae **sp. n.** (Fig. 1A-C)

Material examined: holotype ♀ (Fig. 1A), 1 paratype adult ♀, 1 paratype subadult ♀ collected at the locality Perepara Dam, Kerala, India, 10°39'9"N, 76°17'21"E, 2 October 2021. (Both holotype ♀ & paratype adult ♀ are deposited in CATE).

Etymology: The plural noun "rhombi" is the Latin word for rhombus shape. The void space between the copulatory ducts is rhombus shaped.

Diagnosis: *H. rhombiae*'s epigyne somewhat similar to *H. crista* Amulya, Sebastian & Sudhikumar, 2022 (Amulya *et al.*, 2022). However, it can be distinguished from the latter by the following combination of characters: 1) The void space between the copulatory duct is "Rhombus" shaped in *H. rhombiae* whereas it is nearly like "spade" in shape in *H. crista*. 2) The extension of the copulatory duct is "conical" in *H. rhombiae* whereas it is comb shaped in *H. crista.* 3) The shape of the spermatheca is "single inverted comma shaped" in *H. rhombiae* whereas it is inverted pear shaped in *H. crista*.

Description: Holotype female (CATE 809278): TL 6.10; CL 1.89, CW 1.86; AL 3.64, AW 2.82. Carapace dark brown, profusely haired, oblong shaped. Entire lateral sides of the carapace excluding the eye region covered with black patches narrowly. Fovea longitudinal and blackish. In dorsal view, eyes arranged in four rows with AER strongly recurved and PER procurved. Clypeus high without lines. Ocular area length 0.55, width 0.83. Eye diameters and inter-distances: AME 0.08, ALE 0.18, PME 0.14, PLE 0.17, eye sizes ALE> PLE > PME >AME; AME-AME 0.13, AME-ALE 0.06, PME-PME 0.28, PME-PLE 0.31, ALE-PLE 0.29, ALE-ALE 0.37, PLE-PLE 0.82. Clypeus height 0.25;

Fig. 1. *Hamataliwa rhombiae* sp. n., holotype female. A. Habitus, dorsal view. B-C. Epigyne. B. ventral view. C. dorsal view.

Chelicera 0.44, downward with one promarginal tooth, one retromarginal tooth. Fang is broad at the base and narrowed towards the tip and pointed. Endite and labium longer than wide. Sternum with scattered long and short hairs. Abdomen inverted pear shaped, densely haired, creamy coloured with the entire abdomen covered with dark brown patches densely covered on the lateral sides. Legs covered with conspicuous long spines. Three tarsal claws. Absence of apical claws in pedipalp. Measurements of pedipalps and

legs: pedipalp 1.42 (0.39 + 0.41 + 0.17 + 0.45), I 7.31 (2.52 + 0.97 + 2.24 + 0.81 + 0.77), II 6.90 (1.95 + 0.76+ 2.25 + 1.22 + 0.72), III 4.94 (1.60 + 0.63 + 1.33+ 0.83 + 0.55), IV 4.28 (1.72 + 0.65 + 0.85 + 0.60 + 0.46). Leg formula: I>II>III>1V. See Table (1) for spination.

Table 1. Spination of leg segments of *Hamataliwa rhombiae* sp. n.

♀	Leg I	Leg II	Leg III	Leg IV	Palp
Femur	pl 3 do 3 rl 2 v 0	pl 2 do 3 rl 2 v 0	pl 1 do 1 rl 1v 0	pl 1 do1 rl 1 v 0	pl 0 do 2 rl 0 v 0
Patella	pl 1 do 1 rl 1 v 0	pl 1 do 1 rl 1 v 0	pl 2 do 3 rl 2 v 0	pl 2 do 2 rl 2 v 0	pl 1 do 1 rl 2 v 0
Tibia	pl 4 do 2 rl 3 v 0	pl 2 do 0 rl 2 v 0	pl 2 do 2 rl 2 v 0	pl 2 do1 rl 1 v 0	pl 1 do1 rl 1 v 0
Metatarsus	pl 2 do 1 rl 2 v 0	pl 2 do 2 rl 2 v 1	pl 2 do 2 rl 2 v 0	pl 2 do 1 rl 2 v 0	
Tarsus	spineless	spineless	spineless	spineless	spineless

Epigyne (Figs. 1B-C) highly sclerotised. Spermathecae single inverted comma shaped, arranged on the anterior of copulatory duct. Copulatory duct just below the spermatheca slightly thickened and narrowed towards distal side and it is short with a conical extension. Fertilisation duct narrow tube parallel to the copulatory duct. The void space between the copulatory duct "Rhombus" shaped.

Male: Unknown

Variations: Three female specimens were measured to quantify the morphological variations. Values are mean ± SD. Total length 6.10 ± 0.2; CL 1.89 ± 0.2, CW 1.86 ± 0.1; AL 3.64± 0.2, AW 2.82 ± 0.2. Diameters and inter-distances: AME 0.08 ± 0.01, ALE 0.18± 0.02, PME 0.14 ± 0.01, PLE 0.17 ± 0.03. AME-AME 0.13 ± 0.02, AME-ALE 0.06 ± 0.01, PME-PME 0.28± 0.02, PME-PLE 0.31 ± 0.02, ALE-PLE 0.29± 0.03, ALE-ALE 0.37 ± 0.03, PLE-PLE 0.082 ± 0.01. Clypeus height 0.25 ± 0.05. Palp 1.42 ± 0.3, leg I 7.31 ± 0.3, leg II 6.90 ± 0.3, leg III 4.94 ± 1.5, leg IV 4.28 ± 0.2.

Distribution: India (Kerala).

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Hamataliwa rhombiae **Amulya & Sudhikumar, 2022**
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First data on the diversity of the spider fauna of Kef Doukhane river (Ghardaïa, Northern Algerian Sahara)

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Abstract

Spiders remain among the poorly known groups of the fauna in Algeria for a number of reasons (*i.e.*, the small number of arachnologists, the large surface of the country, the rigorous climate in the Saharan part … etc.). The actual available data of the araneofauna of Algeria are also not updated in general, or not yet revised. This study was carried out in the wetland of Kef Doukhane (Ghardaïa, Algeria). The collected material was randomly sampled around the river using direct hunting method. The taxonomical study revealed a number of 12 species of spiders belonging to 9 families and 12 genera. The families Araneidae, Gnaphosidae, and Salticidae were the most diversified with 2 species for each of them, the rest of the families are represented by only one species. The most dominant species were *Larinia chloris* and *Larinioides suspicax* of family Araneidae (51.43 %). This study increased the number of the known spiders in the region of Ghardaïa to 21 species instead of 12.

Keywords: wetland, arid ecosystem, Sahara, spiders, systematic list, Algeria.

Introduction

Spiders are found almost everywhere on earth, from Arctic islands to dry desert regions (Foelix, 2011). They are particularly abundant in areas of rich vegetation and have conquered all possible ecological niches on land (Amalin, 2004). Their capability to survive under extreme conditions and to disperse by ballooning through the atmosphere from place to place on silken threads allowed spiders to colonize a wide variety of different terrestrial habitats (Nyffeler & Birkhofer, 2017). All spiders are carnivorous, they feed on arthropods and even on vertebrate prey as an alternative food source (Foelix, 2011; Nyffeler & Gibbons, 2022).

Algeria is the largest country in Africa with a total land area of 2,381,741 km². The climate of the country stretches from sub-tropical in the coastal northeast part of the country to semi-arid in the Hauts Plateaux and an arid climate across the Sahara (Samraoui & Samraoui, 2008). The Sahara Desert occupies more than 80% of Algeria. It provides a very constraining edapho-climatic characteristics for the spontaneous survival of living beings (Chehma *et al.*, 2005). The different geomorphological zones that can be found in the Sahara are: sandy soils (Erg), stony grounds (Reg), hard rocky plateaus (Hamada), riverbeds, Sebkha and depressions.

The spider fauna of Algeria is still poorly known and not up to date (Alioua *et al.*, 2016). During the last years, researchers started to give interest to the araneaofauna of the Sahara and many systematic lists and inventories have been published recently like the works of Alioua *et al.* (2012), Alioua *et al.* (2016), and Alioua & Bosmans (2022).

Wetlands are aquatic habitats that usually have a number of common features, such as the presence of specific vegetation, soils, and water regimes, including the occurrence of continuous, seasonal, or periodic standing water or saturated soils (Gerbeaux *et al.*, 2018). Saharan wetlands are essential ecosystems (Bouzid, 2017). Many of them are particularly vital, for migratory water birds for example, they are considered as staging areas before or after crossing the Sahara Desert (Samraoui & Samraoui, 2008).

The current study aims to establish the first systematic list of the spider fauna collected from the artificial wetland of Kef Doukhane river in Ghardaïa region.

Material and Methods

Study area

Ghardaïa is located at 600 Km south of the capital Algiers, in the Saharan region of the country. It is characterized by a hot arid climate with a mild winter. The mean annual recorded values for the region during 2017 were 33.79 mm for precipitation and 22.5°C for temperature.

Kef Doukhane wetland is located at 15 km to the north-east of Ghardaïa, at 390 to 430 m a.s.l. (Fig. 1). It is a channel in a riverbed of about 22 km length on the Mzab river, it passes different rocky and sandy structures (Alioua & Bosmans, 2020). According to Chedad *et al.* (2020), this wetland was created recently, after the creation of El Atteuf wastewater treatment plant in 2012. The river is characterized by vegetation on the banks hosting several species of birds, reptiles and other animals. For vegetation, we have identified during this study the following 15 species: *Antirrhinum ramosissimum*, *Asteriscus graveolens*, *Cynodon dactylon*, *Cyperus laevigatus*, *Nicotiana glauca*, *Oudneya africana*, *Peganum harmala*, *Pergularia tomentosa*, *Phragmites communis*, *Randonia africana*, *Retama raetam*, *Ricinus communis*, *Stipagrostis pungens*, *Tamarix gallica*, *Typha* sp. (Fig. 2). For the avifauna, Chedad *et al.* (2020) have identified 51 species of birds.

Sampling

Material was collected during 2017 and 2018. Spiders were randomly sampled around the river by hunting directly from the vegetation, on the ground, and under stones. Specimens were preserved in tubes containing 70% ethanol. Stereomicroscopes, Nikon SMA 1270 and Wild M7A, were used for specimens' examination. Since the sampling was taken in a short period, it may not reflect the true diversity of the area, but it gives a preliminary list of the spiders of the wetland.

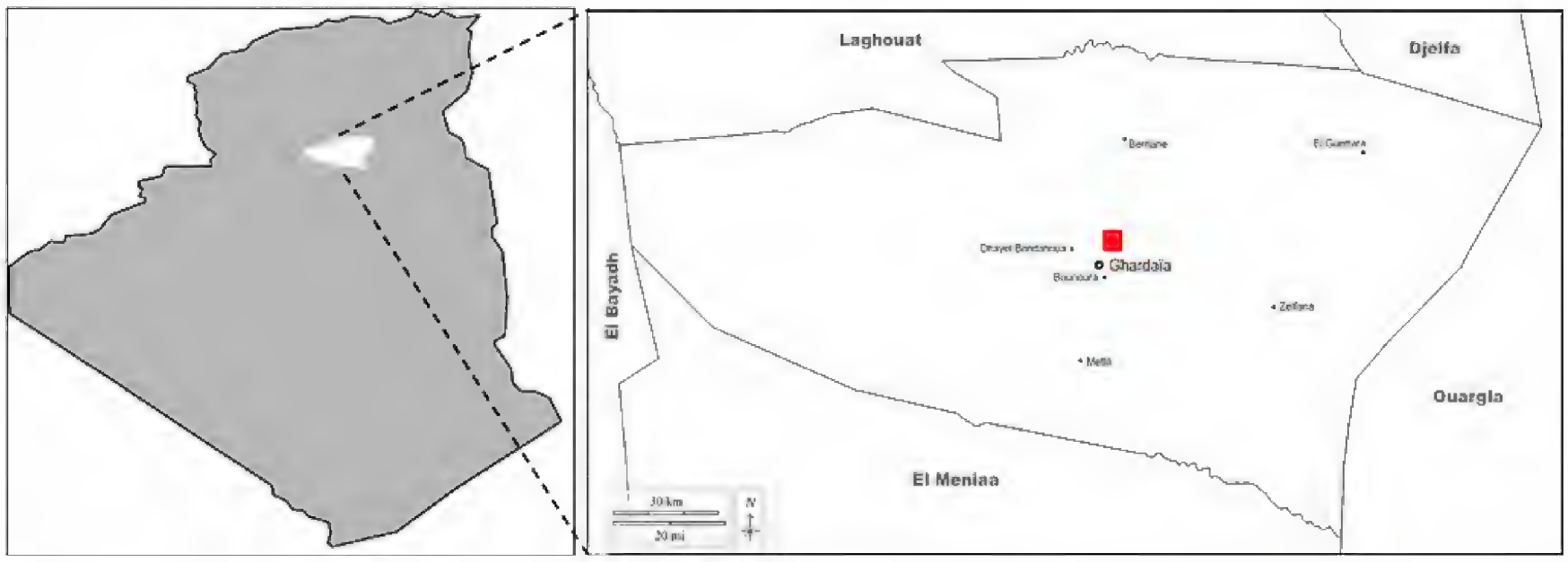

Fig. 1. Map of Algeria showing the position of Ghardaïa and study area (Red rectangle).

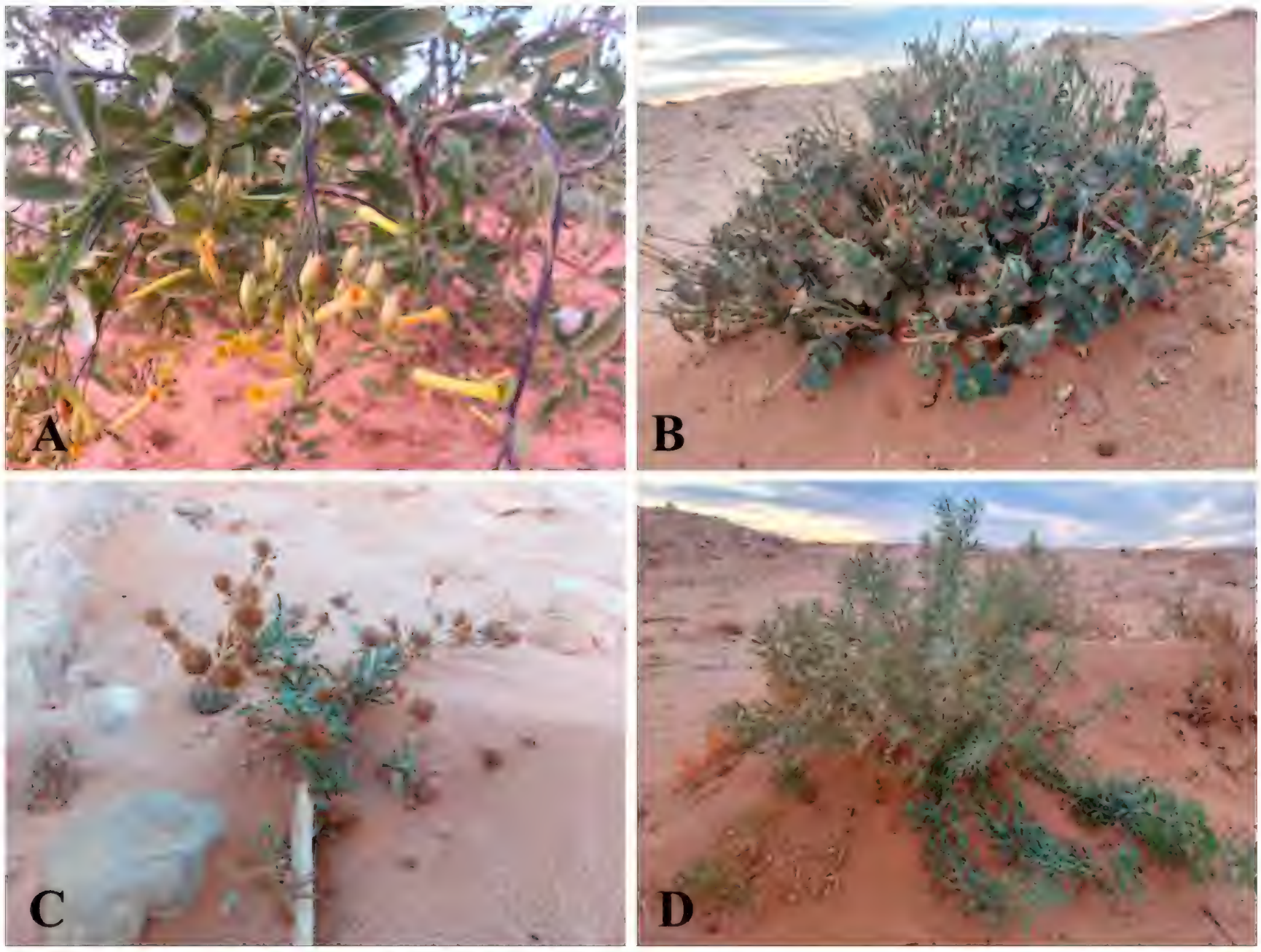

Fig. 2. Some plants identified in the study area: A. *Nicotiana glauca*. B. *Pergularia tomentosa*. C. *Asteriscus graveolens*. D. *Peganum harmala*.

Results and Discussion

A total number of 113 spiders were collected in this study: 35 adults (18 males and 17 females) and 78 juveniles. Taxonomically, the adult spiders belong to 12 species under 9 families and 12 genera. The families Araneidae, Gnaphosidae, and Salticidae were the most diversified with 2 species for each of them, the rest of the families are represented by only one species.

The most dominant species is *Larinia chloris* (Savigny, 1825) with 14 individuals (40.00%), followed by *Larinioides suspicax* (O. Pickard-Cambridge, 1876) with 4 individuals (11.43%) (Table 1 & Fig. 3).

Table 1. List of the species of spiders collected in The Kef Doukhane river.

Family	Species	Number of individuals	Relative abundance (%)
Agelenidae	*Benoitia lepida* (O. Pickard-Cambridge, 1876)	1	2.86
Araneidae	*Larinia chloris* (Savigny, 1825)	14	40.00
	Larinioides suspicax (O. Pickard-Cambridge, 1876)	4	11.43
Eresidae	*Stegodyphus lineatus* (Latreille, 1817)	1	2.86
Gnaphosidae	*Nomisia aussereri* (L. Koch, 1872)	1	2.86
	Poecilochroa senilis (O. Pickard-Cambridge, 1872)	2	5.71
Lycosidae	*Trochosa urbana* O. Pickard-Cambridge, 1876	1	2.86
Salticidae	*Bianor albobimaculatus* (Lucas, 1846)	2	5.71
	Thyene imperialis (Rossi, 1846)	4	11.43
Sicariidae	*Loxosceles mrazig* Ribera & Planas, 2009	1	2.86
Tetragnathidae	*Tetragnatha nitens* (Savigny, 1825)	3	8.57
Titanoecidae	*Nurscia albomaculata* (Lucas, 1846)	1	2.86

In comparison to the study of Alioua *et al*. (2022) on the arachnids of the Wetland of Sebkhet El Melah, the authors have identified, among the 104 captured individuals of spiders, 23 species under 12 families and 21 genera. The families Lycosidae and Salticidae were the most diversified in species with four for each one, then the two families Araneidae and Dictynidae with three species, the Gnaphosidae was represented by two species and for the rest of the families, they were represented by only one species for each of them.

Considering that Kef Doukhane and Sebkhat El Melah are wetlands located in the same Saharan region with a distance of 260 km between them, six species of spiders were common and occurred in both sites, namely: *Benoitia lepida*, *Larinia chloris*, *Larinioides suspicax*, *Stegodyphus lineatus*, *Trochosa urbana*, and *Bianor albobimaculatus*.

In literature, Ghardaïa region (El Atteuf, Ghardaïa and Bounoura municipalities) is known by 12 species namely: *Agyneta pseudorurestris* Wunderlich, 1980 by Bosmans (2006), *Bianor albobimaculatus* (Lucas, 1846) by Logunov (2001), *Haplodrassus dentifer* Bosmans & Abrous, 2018 by Bosmans *et al.* (2018), *Heriaeus algericus* Loerbroks, 1983 by Loerbroks (1983), *Larinia chloris* (Savigny, 1825) by Alioua *et al.* (2020), *Microctenonyx subitaneus* (O. Pickard-Cambridge, 1875) by Bosmans (2007), *Nigma puella* (Simon, 1870) by Simon (1911), *Oecobius paulomaculatus* Wunderlich, 1995 by Wunderlich (1995), *Poecilochroa senilis* (O. Pickard-Cambridge, 1872) by Alioua & Bosmans (2020), *Pulchellodromus pardalis* (Muster & Bosmans, 2007) by Muster *et al.* (2007), *Scytodes annulipes* Simon, 1907 By Van Keer & Bosmans (2014), *Wadicosa fidelis* (O. Pickard-Cambridge, 1872) by Denis (1954). It is worth to mention

here that *Larinia chloris* and *Poecilochroa senilis* are two new records for the country and the results have already been reported previously Alioua *et al*. (2020) and Alioua & Bosmans (2020).

Fig. 3. Some recorded spiders in Kef Doukhane river: A. *Tetragnatha nitens*. B. *Benoitia lepida* in its funnel web. C. *Stegodyphus lineatus*.

This richness of spider species in this riverbed region can be justified by the constant presence of water and the diversity of the plant cover which represents a heterogeneous and complex environment and benefits spiders by providing shelter and substrates for web building, attracting prey, and offering suitable micro-habitat for reproduction, whereas spiders can benefit plants by providing nutritional resources by consuming or deterring herbivore insects (Schmalhofer, 2001; Whitney, 2004).

The results of this work remain not sufficient to highlight the true diversity of studied area for many reasons as the short sampling period and the very fast behaviour of development of the site due to its permanent water streams. Among the results of this work, the number of known spiders for the region of Ghardaïa has been increased from 12 to 21 species.

Acknowledgments

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The first record of *Dysdera lata* Reuss, 1834 (Araneae: Dysderidae) in Jordan

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Abstract

Dysdera lata Reuss, 1834 of family Dysderidae is recorded from Jordan for the first time. Only one male specimen of this species was collected in September 1987 in the vicinity of Abu Nseir, Amman, Jordan. This is the first record of a species of the family Dysderidae too.

Keywords: Araneae, Dysderidae, *Dysdera lata*, Jordan.

Introduction

Thirty five years ago, during a visit to my wife's parents in their new house in Abu Nseir, I looked for spiders in the undisturbed fauna of this newly inhabited region of Amman. I could find spiders of different families under stones including the studied *Dysdera* in the present work.

Family Dysderidae C.L. Koch, 1837 includes 581 species and 10 sub-species in 25 genera. The largest dysderid genera are: *Dysdera* Latreille, 1804 [287 species and 10 sub-species] and *Harpactea* Bristowe, 1939 [188 species]. All dysderids are Palaearctic, mainly Mediterranean (World Spider Catalog, 2022).

Taxonomic references

(World Spider Catalog, 2022)

Dysdera lata Reuss, 1834: 201-202 (D♀). - Egypt; Deeleman-Reinhold & Deeleman, 1988: 200, f. 201-205, 210 (♂♀,♂ had previously been misidentified as that of *D. westringi*); Dunin, 1992: 62, f. 5 (♂♀); Kovblyuk, Prokopenko & Nadolny, 2008: 292, f.

37-56 (♂♀, S); Le Peru, 2011: 241, f. 303 (♂♀); Bosmans, Lissner & Hernández-Corral, 2017: 383, f. 4-5, 25-26, 29 (♂♀); Barrientos & Febrer, 2017: 11, f. 3a-b (♂); Mezőfi & Markó, 2018: 2, f. 3a-b (♂); Pantini, Bonelli & Bonacci, 2020: 27, f. 4a-b (♂).

Dysdera westringi Chyzer & Kulczyński, 1897: 267, pl. 10, f. 39 (♂♀); Simon, 1914: 95, 111, f. 157 (♂♀); Drensky, 1938: 92, f. 8b (♂); Charitonov, 1956: 24, f. 9 (♂); Loksa, 1969: 75, f. 52A-B (♂♀) (misidentified).

Dysdera taurica Charitonov, 1956: 36, f. 10 (D♂♀); Tystshenko, 1971: 71, f. 103 (♂); Deeleman-Reinhold & Deeleman, 1988: 208, f. 208, 215 (♂♀); Řezáč, Král & Pekár, 2008: 453, f. 39-42 (♂♀); *Dysdera laurica* Heimer & Nentwig, 1991: 44, f. 93 (♂♀, lapsus).

Distribution
North Africa (Morocco, Algeria, Tunisia, Egypt), Palestine, Syria, Turkey, Greece (Crete), Cyprus, France (Corsica), Portugal, Spain, Italy, Czechia, Slovakia, Hungary, Romania, Bulgaria, Moldova, Ukraine, Russia, Georgia.

Family Dysderidae C.L. Koch, 1837
Dysdera Latreille, 1804
Dysdera lata Reuss, 1834 (Figs. 1-6)

Material examined. Jordan, 1♂ (Figs. 1-4), vicinity of Abu Nseir, north of Amman (approximately 32°04'14"N, 35°53'21"E elev. 924 m), 19 September 1987, under stone, leg. Hisham K. El-Hennawy [ACE.1987.09.19.AR.001.JOR]*.

Measurements (in millimetres):
Total length 5.9; Cephalothorax length 2.9, width 2.2; Abdomen length 2.9.
[The examined specimen is smaller than those studied before by:
♂ body length: 7-8 mm (Nentwig *et al.*, 2022)
♂ cephalothorax: 3.7-4.7 mm (Deeleman-Reinhold & Deeleman, 1988)
♂ carapace 3.4-5.9 mm long (Řezáč *et al.*, 2008)]

Palp and palpal organ: prolateral view (Fig. 5), retrolateral view (Fig. 6).

* [ACE = Arachnid Collection of Egypt]

Fig. 1. *Dysdera lata* Reuss, 1834 ♂. Habitus, dorsal view.

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Figs. 2-6. *Dysdera lata* Reuss, 1834 ♂. 2. Cephalothorax, dorsal view. 3. Abdomen, dorsal view. 4. Ocular area, enlarged. 5-6. Palp. 5. prolateral view. 6. retrolateral view.

With this new record, the list of spiders of Jordan (El-Hennawy, 2020) is expanded to include 16 families, 27 genera, and 32 species and more records are expected.

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